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August 29, 2019

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LA PUBLIC SERVICE COMMISSION

Via Federal Express

Ms. Terri Lemoine Bordelon
Docketing Division
Louisiana Public Service Commission
Galvez Building, 12th Floor
602 North Fifth Street
Baton Rouge, LA 70802

Re: **Docket No. I-34715** – Integrated Resource Planning ("IRP") process for Southwestern Electric Power Company (SWEPCO), pursuant to General Order dated April 20, 2012

Dear Terri:

We attach for filing in the above captioned docket Southwestern Electric Power Company's IRP Report with confidential and public versions of Appendix Vol.2 and confidential Appendix Vol.3, along with the requisite copies. The confidential documents are being filed under seal in accordance with Commission Rules of Practice and pursuant to Rule 12.1. We have also enclosed an extra copy of this correspondence, which we request you stamp and return in the enclosed self-addressed stamped envelope.

As always, we appreciate your continued cooperation and assistance.

With best regards, I am

Yours very truly,

WILKINSON, CARMODY & GILLIAM

By: Jonathan P. McCartney
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JPM/mml
Enclosure(s)

Fed EX

SOUTHWESTERN ELECTRIC POWER COMPANY

An AEP Company

BOUNDLESS ENERGY

INTEGRATED RESOURCE PLANNING REPORT

TO THE

LOUISIANA PUBLIC SERVICE COMMISSION

August 29, 2019

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Cross Reference Table

REQUESTS OF THE LOUISIANA PUBLIC SERVICE COMMISSION STAFF	Location of SWEPCO's Response
The discussion of Existing Supply-Side Resources, and specifically the chart on page 23, did not include some of the information described in Section 5(b) of the IRP Rules, such as: 1) ownership information 2) condition of the resource; and 3) locations.	Refer to the updated Table 1 in Section 3.2
Staff requested that the Company's Final IRP Report include a detailed narrative discussion of the assumptions behind the Company's deactivations decisions, including any subjective decisions made in the assumptions. This discussion should also include any analysis which was performed with the result being a decision not to deactivate a unit.	See the updated Section 3.2
SWEPCO's Final IRP Report should include estimates of the rate impacts of the Company's portfolios.	See the updated Section 5.3.2
In order to comply with the IRP Order, the Company's Final IRP Report should include a discussion of existing fuel contracts.	See the updated Section 3.2.1
Staff requests that the Company's Final IRP Report contain a Five-Year Action Plan that complies with the IRP Rules.	See the Executive Summary and Section 6.1
Staff recommends that the Company include a chart responding to each of the stakeholders' comments on the Company's Draft IRP Report in the Company's Final IRP Report.	see Exhibit I

Executive Summary

This Integrated Resource Plan (IRP, Plan, or Report) is submitted by Southwestern Electric Power Company (SWEPCO or Company) based upon the best information available at the time of preparation. However, changes that affect this Plan can occur without notice. Therefore, this Plan is not a commitment to specific resource additions or other courses of action, as the future is highly uncertain. Accordingly, this IRP and the action items described herein are subject to change as new information becomes available or as circumstances warrant.

An IRP explains how a utility company plans to meet the projected capacity (*i.e.,* peak demand) and energy requirements of its customers. SWEPCO is required to provide an IRP that encompasses a 20-year forecast planning period (in this filing, 2019-2038). This IRP has been developed using the Company's current long-term assumptions for:

- Customer load requirements – peak demand and energy;
- commodity prices – coal, natural gas, on-peak and off-peak power prices, capacity and emission prices;
- supply-side alternative costs – including fossil fuel, renewable generation, and storage resources; and
- demand-side program costs and impacts.

To meet its customers' future energy requirements, SWEPCO will continue the operation of, and ongoing investment in, its existing fleet of generation resources including its efficient base-load coal plants, its newer combined cycle and combustion turbine plants, and certain older gas-steam plants. In addition, SWEPCO must consider the impact of the ongoing promulgation of environmental rules as well as the emergence of new technologies and renewable energy resources, both large-scale and distributed.

Keeping all of the various considerations discussed above in mind, SWEPCO has analyzed various scenarios that would provide adequate supply and demand resources to meet its peak load obligations, and reduce or minimize costs to its customers, including energy costs, for the next twenty years.

Environmental Compliance Issues

This 2019 IRP considers the impacts of final and proposed U.S. Environmental Protection Agency (EPA) regulations to SWEPCO generating facilities. Environmental compliance requirements have a major influence on the consideration of new supply-side resources for inclusion in the IRP because of the potential significant effects on both capital and operational costs. In addition, the IRP development process assumes potential future regulation of greenhouse gas (GHG)/carbon dioxide (CO_2). For that purpose, a reasonable proxy was utilized in the IRP that assumed that the resulting economic impact would be equivalent to a CO_2 "tax" applicable to each ton of carbon emitted from fossil-fired generation which would take effect beginning in 2028. Under the Company's Base commodity pricing scenario, the cost of such CO_2 emissions is equal to $15/metric ton commencing in 2028 and escalating at 5% per annum thereafter on a nominal dollar basis.

Louisiana IRP Stakeholder Process

In Louisiana, various stakeholders, including Louisiana Commission staff, were presented IRP assumptions in July 2018 and provided useful feedback which has been considered and incorporated in the analysis assumptions, where warranted.

Key dates related to the IRP process are shown below:

➢ SWEPCO submits request to initiate IRP Process	Dec. 2017
➢ SWEPCO holds first Stakeholder meeting	July 2018
➢ Stakeholders and Staff Comment on proposed plan	Sept. 2018
➢ Draft IRP is published	Jan. 2019
➢ SWEPCO holds second Stakeholder meeting	Feb. 2019
➢ Stakeholders file comments	April 2019
➢ Staff files comments	May 2019
➢ SWEPCO files Final IRP	Aug. 2019
➢ Staff submits recommendations to the Commission	Nov. 2019
➢ Commission Order acknowledging the IRP	Dec. 2019

Summary of SWEPCO Resource Plan

SWEPCO's retail sales are projected to grow at 0.2% per year with stronger growth expected from the residential class (+0.5% per year) while the commercial class experiences a modest decrease (-0.1% per year) and the industrial class experiences modest increases (0.2% per year) over the forecast horizon. The projected change in SWEPCO's internal energy over the next 20 years is for requirements to increase by 0.3% per year. Finally, SWEPCO's peak demand is also expected to increase at an average rate of 0.3% per year through 2039.

Figure ES- 1 below shows SWEPCO's "going-in" (i.e. before resource additions) capacity position over the planning period. In 2030, SWEPCO anticipates experiencing a 167MW capacity shortfall which then grows to approximately 1,600MW shortfall by 2038.

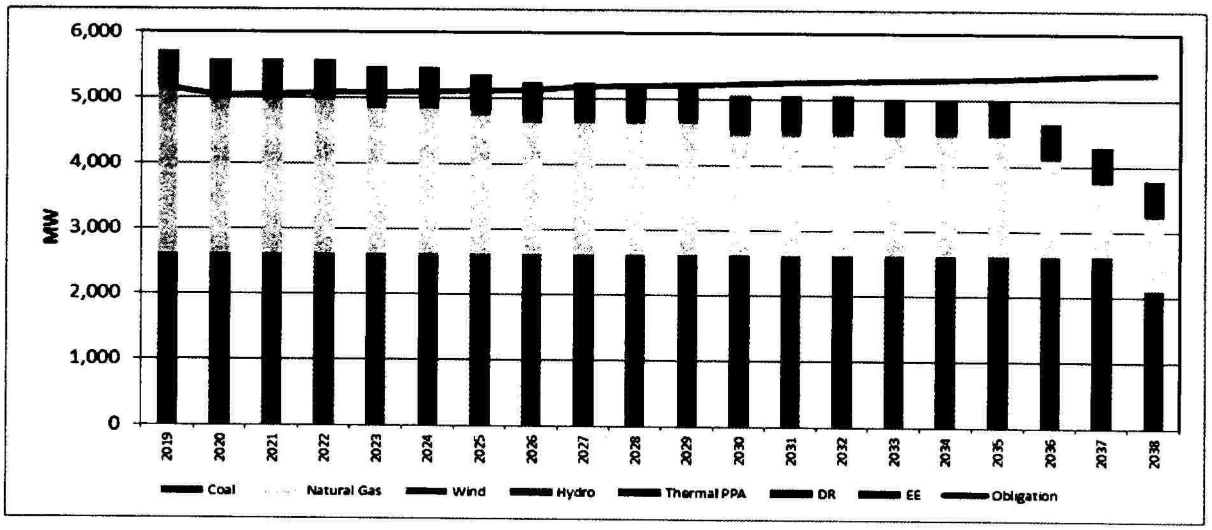

Figure ES- 1: SWEPCO "Going-In" SPP Capacity Position

To determine the appropriate level and mix of incremental supply and demand-side resources required to offset such going-in capacity deficiencies, SWEPCO utilized the *Plexos*® Linear Program (LP) optimization model to develop a "least-cost" resource plan. Although the IRP planning period is limited to 20 years (through 2038), the *Plexos*® modeling was performed through the year 2048 so as to properly consider various cost-based "end-effects" for the resource alternatives being considered.

SWEPCO used the modeling results to develop a Preferred Plan or "Plan". To arrive at the Preferred Plan, using Plexos®, SWEPCO developed optimal portfolios based on five long-term commodity price forecasts and two load sensitivities. The Preferred Plan balances cost and other factors such as risk and environmental regulatory considerations, to cost effectively meet SWEPCO's demand and energy obligations. Given that the optimal portfolios under the five commodity pricing scenarios offer comparable resource additions, as discussed in Section 5, SWEPCO has elected to use the optimal plan developed under the Base commodity pricing scenario as its Preferred Plan.

Table ES- 1 provides a summary of the Preferred Plan, which was selected based on the results from optimization modeling under various load and commodity pricing scenarios:

Table ES- 1. Preferred Plan Cumulative Capacity Additions throughout Planning Period (2019-2038)

Commodity Pricing Scenario		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Base/ Preferred Plan	New Nat. Gas																				373
	New Solar (Nameplate)											150	300	600	800	950	1,100	1,250	1,400	1,400	1,400
	New Solar (Firm)											75	150	300	400	475	550	625	700	700	700
	New Wind (Nameplate			200	800	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	2,000	2,200	2,200	2,200
	New Wind (Firm)			31	122	214	214	214	214	214	214	214	214	214	214	214	214	306	337	337	337
	New EE		5	8	10	10	11	12	11	10	8	7	6	6	5	5	3	3	2	2	1
	New VVO		24	24	24	24	24	24	24	24	24	24	24	24	34	34	47	47	47	47	58
	New DG	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	7	7	7	8
	STMP																				150
Capacity Reserves (MW) Above SPP Rqmts w/o new additions		547	540	510	480	373	357	237	119	50	47	15	(167)	(189)	(209)	(287)	(295)	(318)	(697)	(1,072)	(1,619)
Capacity Reserves (MW) Above SPP Rqmts with new additions		550	572	576	640	624	610	491	373	303	299	341	232	361	450	446	525	669	395	20	7

In summary, the Preferred Plan:

- Adds 200MW (nameplate) of wind resources in 2021, an additional 600MW (nameplate) in 2022 and 2023, 600MW (nameplate) in 2035 and 200MW (nameplate) in 2036 for a total of 2,200MW (nameplate) by the end of the planning period.
- Adds 150MW (nameplate) utility-scale solar resources beginning in 2029 increasing to 1,400MW (nameplate) of utility-scale solar by the end of the planning period.
- Implements customer and grid energy efficiency programs, including VVO, reducing energy requirements by 243GWh and capacity requirements by 59MW by 2038.
- Fills long-term needs through the addition of a total of 373MW of natural gas combined-cycle generation in 2038 to replace planned unit retirements.
- Recognizes additional distributed solar capacity will be added by SWEPCO's customers, beginning with 10MW (nameplate) in 2019 and growing to 24MW (nameplate) by 2038.

- In 2038, includes the addition of 150MW of Short-Term Market Purchases (STMP).

SWEPCO customers should recognize an increasing level of savings in their monthly bill over the planning period versus a plan with no renewables. The levelized monthly bill impact[1] analysis of the Preferred Plan relative to a plan where no renewables are selected indicates SWEPCO customer savings grow to over $15/month in their monthly bills.

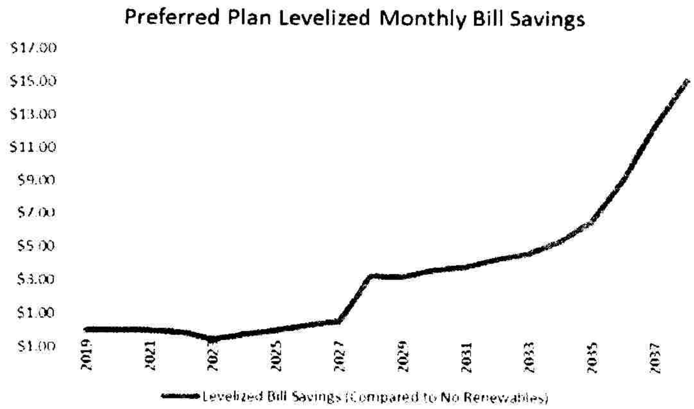

Figure ES- 2: SWEPCO Levelized Monthly Bill Savings

SWEPCO capacity changes over the 20-year planning period associated with the Preferred Plan are shown in Figure ES- 3 and Figure ES- 4. These figures show that the Preferred Plan would reduce SWEPCO's reliance on fossil fuel-based generation, and increase reliance on renewable resources. Specifically, over the 20-year planning horizon the Company's nameplate capacity mix attributable to renewable assets would increase from 8% to 46%, and fossil fuel-fired asset capacity declines from 91% to 52% due to the retirement of older gas steam units over the planning period and the retirement of a coal unit in 2037. Demand-side management (DSM), Demand Response (DR) and Distributed Generation resources increase from 1.2% to 2.0% of total nameplate capacity resources.

[1] The levelized monthly bill impact is an indicative estimate of the incremental cost (or savings) compared to a plan where no renewables were included. This indicative estimate is only capturing the costs and benefits related to the proposed resource additions included in this IRP. The estimate assumes the impact to an "Average Customer" that uses 12,000 kWh per year.

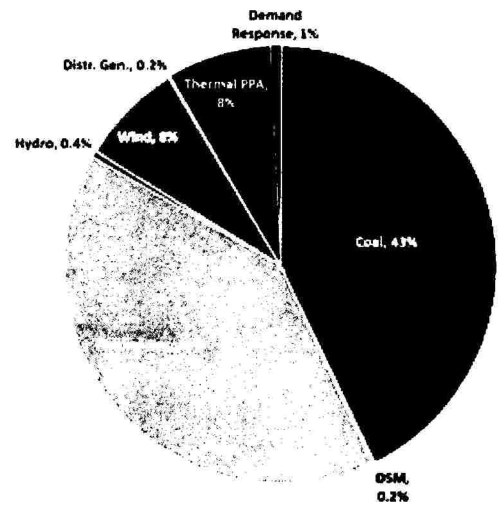

Figure ES- 3: 2019 SWEPCO Nameplate Capacity Mix

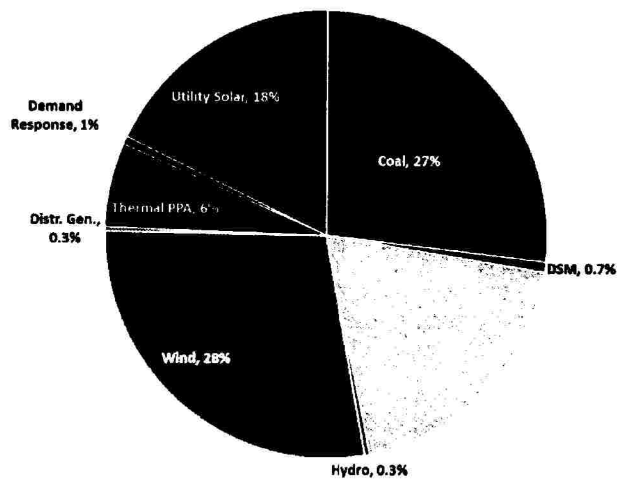

Figure ES- 4: 2038 SWEPCO Nameplate Capacity Mix

The relative impacts to SWEPCO's annual energy position are shown in Figure ES- 5 and Figure ES- 6. SWEPCO's energy output attributable to fossil fuel generation decreases from 88% to 48% over the planning period, while energy from renewable resources increases from 12% to 51%. Specifically, the Preferred Plan introduces solar resources, which contributes to 12% of total energy and energy from wind resources increases from 12% to 36% of SWEPCO's total energy mix.

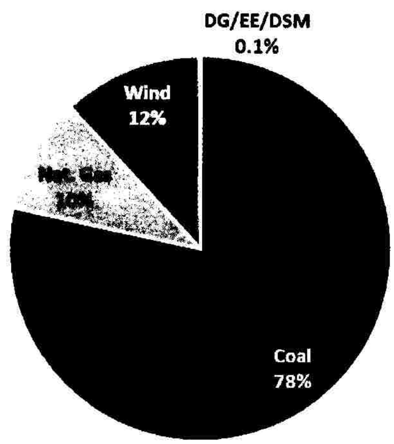

Figure ES- 5: 2019 SWEPCO Energy Mix

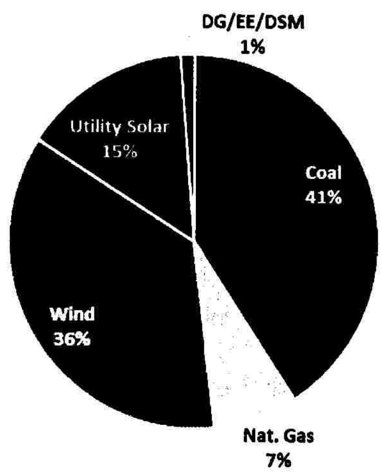

Figure ES- 6: 2038 SWEPCO Energy Mix

Figure ES- 7 and Figure ES- 8 show annual changes in capacity and energy mix, respectively, that result from the Preferred Plan, relative to capacity and energy requirements. The capacity contribution from renewable resources is fairly modest due to the treatment of capacity credit for intermittent resources within SPP; however, those resources (particularly wind) provide a significant volume of energy. Wind resources were selected in all of the scenarios because they are a low cost energy resource. When comparing the capacity values in Figure ES- 7 with those in Figure ES- 3 and Figure ES- 4, it is important to note that Figure ES- 7 provides an analysis of SPP-recognized capacity, while Figure ES- 3 and Figure ES- 4 depict nameplate capacity.

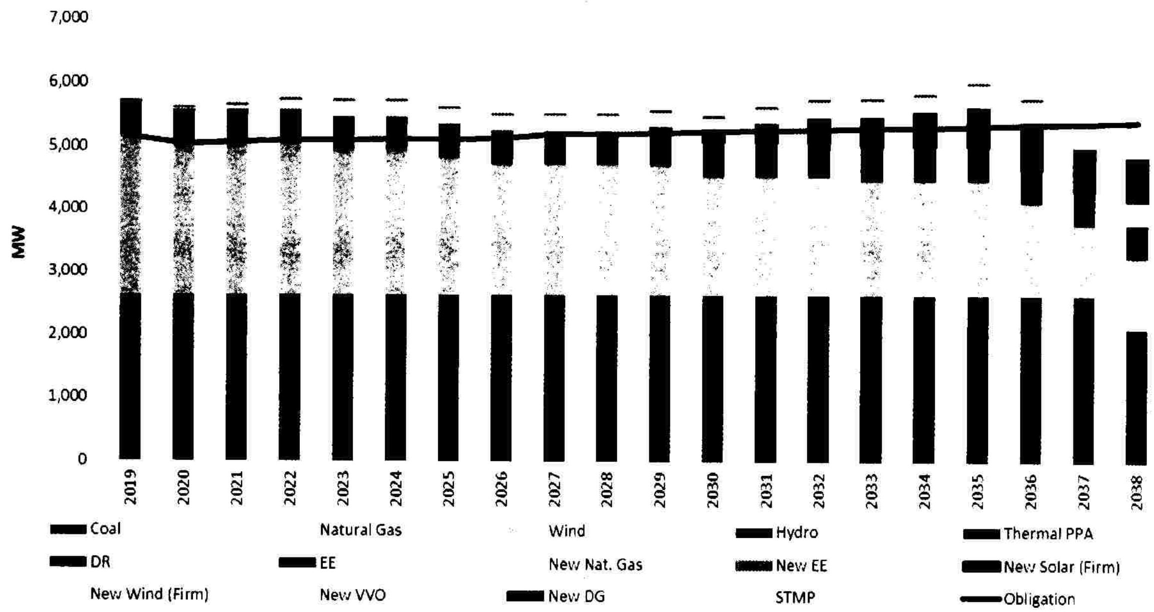

Figure ES- 7: SWEPCO Annual SPP Capacity Position (MW) per the Preferred Plan

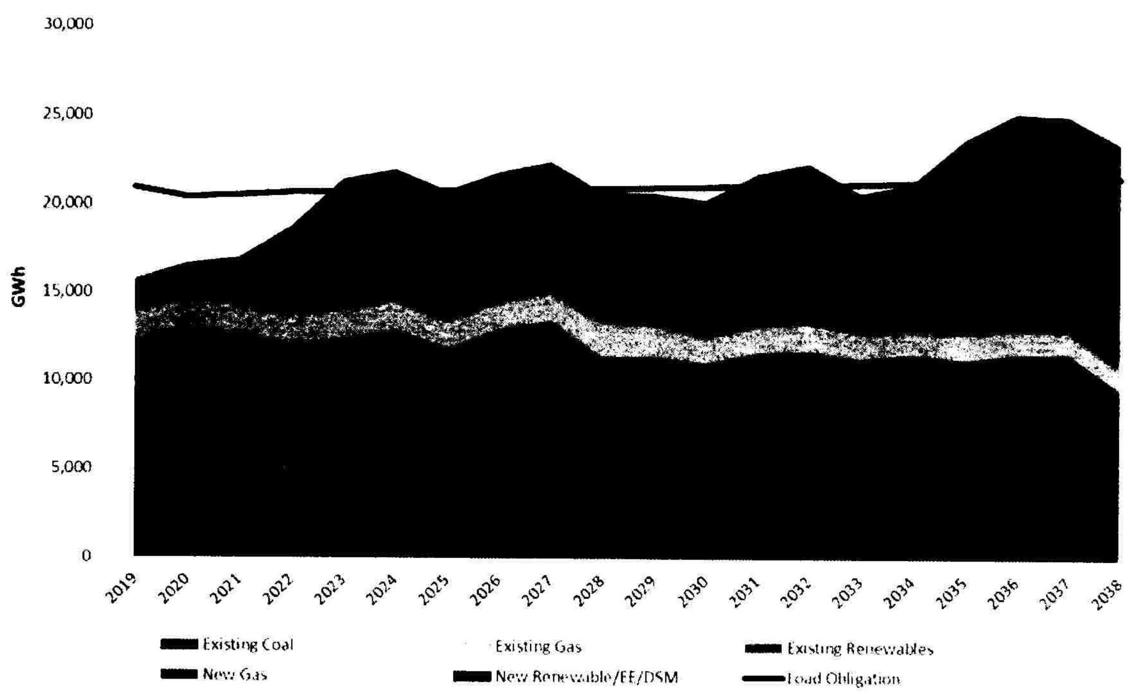

Figure ES- 8: SWEPCO Annual Energy Position (GWh) per the Preferred Plan

SWEPCO Five-Year Action Plan

In reference to the Preferred Plan and SWEPCO's ability to provide adequate capacity resources at a reasonable cost, the following actions over the next five (5) years are anticipated.

- Proceed with necessary regulatory filings consistent with commission rules around plant retirements including the Lone-Star 1, Lieberman 2 (12/31/2019) and Knox Lee Units 2 and 3 retirements (1/1/2020).
- Wind Resource Integration: Continue with the recently released Request for Proposal (RFP) to explore opportunities to add cost-effective wind generation in the near future to take advantage of the Federal Production Tax Credit.
- Solar Resource Integration: Continue efforts related to the notice filed with the commission to proceed with an RFP process in support of adding cost effective utility–scale solar resources.
- Environmental Impacts: Remain committed to closely following developments related to environmental regulations and update our analysis of compliance options and timeliness when sufficient information becomes available.
- Continue to work with the Commissioners related to the Quick Start Phase of energy efficiency programs scheduled to continue through December 31, 2019 and any potential extensions beyond 2019.
- Continue with the seasonal operation of Dolet Hills and continue to evaluate its viability.

Conclusion

SWEPCO's Preferred Plan provides the Company with an increasingly diversified portfolio of supply- and demand-side resources which provides flexibility to adapt to future changes to the power market, technology, and environmental regulations. The addition of renewables and demand-side management mitigates fuel price and environmental compliance risk. At the end of the planning period, efficient natural gas-fired generation will replace the capacity from a solid fuel unit that is expected to retire.

Inasmuch as there are many assumptions, each with its own degree of uncertainty, which had to be made in the course of resource portfolio evaluations, material changes in these assumptions could result in modifications. The action plan presented in this IRP is sufficiently flexible to accommodate possible changes in key parameters, including load growth, environmental compliance assumptions, fuel costs, and construction cost estimates, which may affect this IRP. By minimizing SWEPCO's costs in the optimization process, the Company's model produced optimized portfolios with the lowest reasonable impact on customers' rates.

1.0 Introduction

1.1 Overview

This Report presents the 2019 Integrated Resource Plan (IRP, Plan, or Report) for Southwestern Electric Power Company (SWEPCO or Company) including descriptions of assumptions, study parameters, and methodologies. The results integrate supply- and demand-side resources.

*The goal of the IRP process is to identify the **amount**, **timing** and **type** of resources required to ensure a reliable supply of capacity and energy to customers at the least reasonable cost.*

In addition to developing a long-term strategy for achieving reliability/reserve margin requirements as set forth by SPP, resource planning is critical to SWEPCO due to its impact on such things as determining capital expenditure requirements, regulatory planning, environmental compliance, and other planning processes.

1.2 Integrated Resource Plan (IRP) Process

This Report covers the processes and assumptions required to develop an IRP for the Company. The IRP process for SWEPCO includes the following components/steps:

- Description of the Company, the resource planning process in general, and the implications of current issues as they relate to resource planning;
- provide projected growth in demand and energy which serves as the underpinning of the Plan;
- identify and evaluate demand-side options such as Energy Efficiency (EE) measures, Demand Response (DR) and Distributed Generation (DG);
- identify current supply-side resources, including projected changes to those resources (*e.g.*, de-rates or retirements), and transmission system integration issues; and
- identify and evaluate supply-side resource options;
- perform resource modeling;
- and utilize results to develop recommended portfolio.

1.3 Introduction to SWEPCO

SWEPCO is an affiliate company of American Electric Power (AEP). With more than five million customers and serving parts of 11 states, AEP is one of the country's largest investor-owned utilities. AEP's service territory covers 197,500 square miles in Louisiana, Arkansas, Texas, Oklahoma, Indiana, Michigan, Kentucky, Ohio, Tennessee, Virginia and West Virginia.

AEP owns and/or operates one of the largest generation portfolios in the United States, with approximately 26,000 megawatts of generating capacity in three RTOs. AEP's customers are served by one of the world's largest transmission and distribution systems. System-wide there are approximately 40,000 circuit miles of transmission lines and more than 222,000 miles of distribution lines.

The operating companies in AEP's Southwest Power Pool (SPP) zone collectively serve a population of about 4.25 million, which includes over 1 million retail customers in a 36,000 square mile area in parts of Arkansas, Louisiana, Oklahoma, and Texas.

SWEPCO's customers consist of both retail and sales-for-resale (wholesale) customers located in the states of Arkansas, Louisiana and Texas (see Figure 1). Currently, SWEPCO serves approximately 539,000 retail customers in those states; including approximately 231,000 and 121,000 in the states of Louisiana and Arkansas, respectively. The peak load requirement of SWEPCO's total retail and wholesale customers is seasonal in nature, with distinctive peaks occurring in the summer and winter seasons. SWEPCO's historical all-time highest recorded peak demand was 5,554MW, which occurred in August 2011; and the highest recorded winter peak was 4,919MW, which occurred in January 2014. The most recent (2018-19) actual SWEPCO summer and winter peak demands were 4,834MW and 4,090MW, occurring on July 19th and January 24th (2019), respectively.

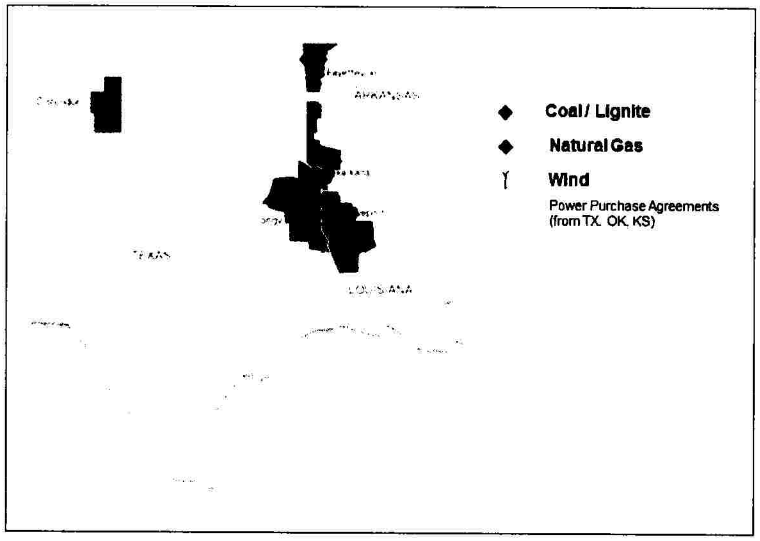

Figure 1. SWEPCO Service Territory

This IRP is based upon the best available information at the time of preparation. However, changes that may affect this plan can, and do, occur without notice. Therefore, this plan is not a commitment to a specific course of action, since the future, now more than ever before, is highly uncertain, particularly in light of economic conditions, access to capital, the movement towards increasing use of renewable generation and end-use efficiency, as well as legislation to control greenhouse gases.

The implementation action items as described herein are subject to change as new information becomes available or as circumstances warrant.

1.3.1 Annual Planning Process

SWEPCO and AEP are engaged in planning activities throughout the year which impact the IRP. Major activities include updating the load forecast, fundamental commodity pricing forecast, and new generation cost and performance characteristics. On an annual basis, the load forecasting group produces a peak demand and energy usage forecast for each operating company. This process typically begins as actual values are received, reviewed, and adjusted. The annual load forecast for this planning process was produced in June 2019.

The fundamental commodity forecast process is continually monitored relative to ongoing activities that could potentially affect the existing commodity forecast values. Typically, the fundamental commodity forecast is updated when material changes are observed or expected. The most recent commodity forecast was released in April of 2019.

New generation resource cost and characteristics are generally updated on an annual basis with a typical first quarter release date. This data is updated as needed if material changes occur between the typical release dates.

Other input data utilized with the IRP process is generally updated on an annual basis unless material differences are identified between the existing input values and expected future values.

2.0 Load Forecast and Forecasting Methodology

2.1 Summary of SWEPCO Load Forecast

The SWEPCO load forecast was developed by AEP's Economic Forecasting organization and completed in June 2019.[2] The final load forecast is the culmination of a series of underlying forecasts that build on each other. In other words, the economic forecast provided by Moody's Analytics is used to develop the customer forecast which is then used to develop the sales forecast which is ultimately used to develop the peak load and internal energy requirements forecast.

Over the next 20-year period (2020-2039)[3], SWEPCO's service territory is expected to see population and non-farm employment experience similar growth of 0.7% and 0.5% per year, respectively. Not surprisingly, SWEPCO is projected to see customer count growth at a rate of 0.3% per year. Over the same forecast period, SWEPCO's retail sales are projected to grow at 0.2% per year with stronger growth expected from the residential class (+0.5% per year) while the commercial class experiences a modest decrease (-0.1% per year) and the industrial class experiences modest increases (0.2% per year) over the forecast horizon. The projected change in SWEPCO's internal energy over the next 20 years is for requirements to increase by 0.3% per year. Finally, SWEPCO's peak demand is also expected to increase at an average rate of 0.3% per year through 2039.

[2]The load forecasts (as well as the historical loads) presented in this report reflect the traditional concept of internal load, i.e., the load that is directly connected to the utility's transmission and distribution system and that is provided with bundled generation and transmission service by the utility. Such load serves as the starting point for the load forecasts used for generation planning. Internal load is a subset of *connected load*, which also includes directly connected load for which the utility serves only as a transmission provider. Connected load serves as the starting point for the load forecasts used for transmission planning.

[3] 20 year forecast periods begin with the first full forecast year, 2020

2.2 Forecast Assumptions

2.2.1 Economic Assumptions

The load forecasts for SWEPCO and the other operating companies in the AEP System incorporate a forecast of U.S. and regional economic growth provided by Moody's Analytics. The load forecasts utilized Moody's Analytics economic forecast issued in December 2018. Moody's Analytics projects moderate growth in the U.S. economy during the 2020-2039 forecast period, characterized by a 2.0% annual rise in real Gross Domestic Product (GDP), and moderate inflation as well, with the implicit GDP price deflator expected to rise by 1.9% per year. Industrial output, as measured by the Federal Reserve Board's (FRBs) index of industrial production, is expected to grow at 1.5% per year during the same period. Moody's projected employment growth of 0.5% per year during the forecast period and real regional income per-capita annual growth of 2.4% for the SWEPCO service area.

2.2.2 Price Assumptions

The Company utilizes an internally developed service area electricity price forecast. This forecast incorporates information from the Company's financial plan for the near term and the U.S. Department of Energy (DOE) Energy Information Administration (EIA) outlook for the West South Central Census Region for the longer term. These price forecasts are incorporated into the Company's energy sales models, where appropriate.

2.2.3 Specific Large Customer Assumptions

SWEPCO's customer service engineers are in frequent touch with industrial and commercial customers about their needs and activities. From these discussions, expected load additions or reductions are relayed to the Company.

2.2.4 Weather Assumptions

Where appropriate, the Company includes weather as an explanatory variable in its energy sales models. These models reflect historical weather for the model estimation period and normal weather for the forecast period.

2.2.5 Energy Efficiency (EE) and Demand-Side Management (DSM) Assumptions

Inherent in the historical data used to specify the load forecast models are the impacts of past customer energy conservation and load management behaviors. Energy usage is being impacted by a combination of federal and/or state efficiency mandates in addition to company sponsored Energy Efficiency (EE) and DSM programs. The statistical adjusted end-use models incorporate changing saturations and efficiencies of the various end-use appliances, which results in a certain amount of EE to be "embedded" into the load forecast.

In addition to the "embedded" EE, the Company also accounts for Commission-approved DSM program impacts in the load forecasting process. For the IRP, the load forecast is used as described with a major assumption change to the state approved EE programs. At a given year, the state approved incremental EE assumption is assumed to stop, with some residual EE going forward due to lingering degradation impacts of prior years. Then, new annual EE assumptions are layered in to replace the state approved EE levels.

2.3 Overview of Forecast Methodology

SWEPCO's load forecasts are based mostly on econometric, state-of-the-art statistically adjusted end-use and analyses of time-series data. This is helpful when analyzing future scenarios and developing confidence bands in addition to objective model verification by using standard statistical criteria.

SWEPCO utilizes two sets of econometric models: 1) a set of monthly short-term models, which extend for approximately 24 months and 2) a set of monthly long-term models, which extends for approximately 30 years. The forecast methodology leverages the relative analytical strengths of both the short- and long-term methods to produce a reasonable and reliable forecast that is used for various planning purposes.

For the first full year of the forecast, the forecast values are generally governed by the short-term models. The short-term models are regression models with time series errors which analyze the latest sales and weather data to better capture the monthly variation in energy sales for short-term applications like capital budgeting and resource allocation. While these models produce extremely accurate forecasts in the short run, without logical ties to economic factors, they are less capable of capturing structural trends in electricity consumption that are more important for longer term resource planning applications.

The long-term models are econometric, and statistically adjusted end-use models which are specifically equipped to account for structural changes in the economy as well as changes in customer consumption due to increased energy efficiency. The long-term forecast models incorporate regional economic forecast data for income, employment, households, output, and population.

The short-term and long-term forecasts are then blended to ensure a smooth transition from the short-term to the long-term forecast horizon for each major revenue class. There are some instances when the short-term and long-term forecasts diverge, especially when the long-term models are incorporating a structural shift in the underlying economy that is expected to occur within the first 24 months of the forecast horizon. In these instances, professional judgment is used to ensure that the final forecast that will be used in the peak models is reasonable. The class level sales are then summed and adjusted for losses to produce monthly net internal energy sales for the system. The demand forecast model utilizes a series of algorithms to allocate the monthly net internal energy to hourly demand. The inputs into forecasting hourly demand are internal energy, weather, 24-hour load profiles and calendar information.

A flow chart depicting the sequence of models used in projecting SWEPCO's electric load requirements as well as the major inputs and assumptions that are used in the development of the load forecast is shown in Figure 2 below.

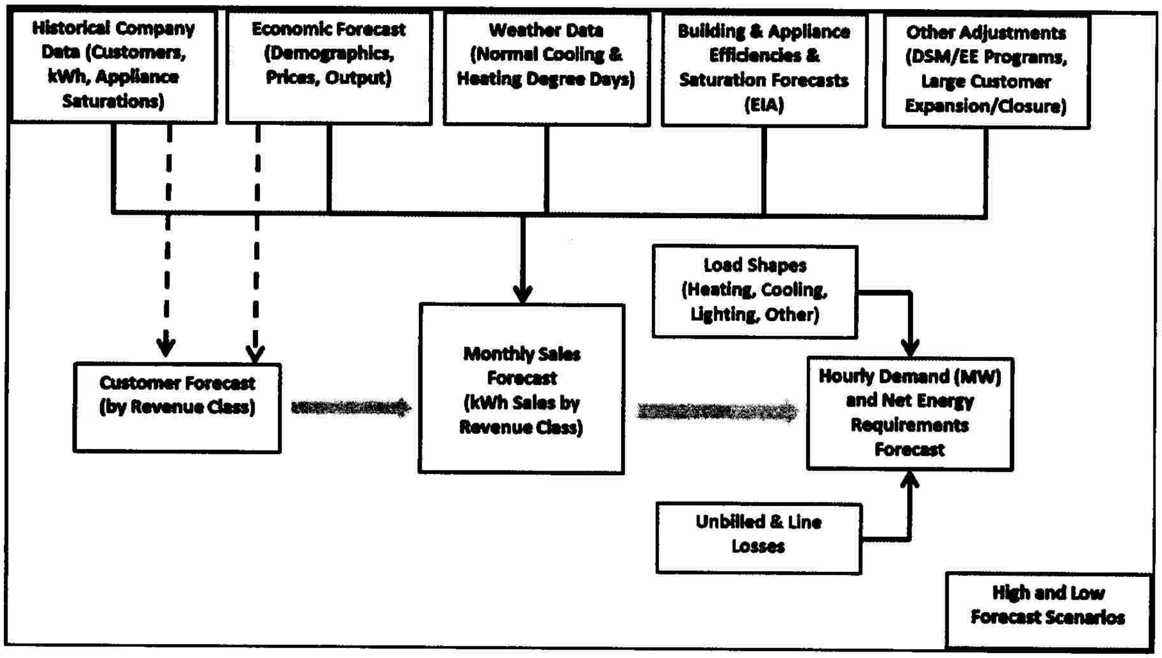

Figure 2. SWEPCO Internal Energy Requirements and Peak Demand Forecasting Method

2.4 Detailed Explanation of Load Forecast

2.4.1 General

This section provides a more detailed description of the short-term and long-term models employed in producing the forecasts of SWEPCO's energy consumption, by customer class. Conceptually, the difference between short and long-term energy consumption relates to changes in the stock of electricity-using equipment and economic influences, rather than the passage of time. In the short term, electric energy consumption is considered to be a function of an essentially fixed stock of equipment. For residential and commercial customers, the most significant factor influencing the short term is weather. For industrial customers, economic forces that determine inventory levels and factory orders also influence short-term utilization rates. The short-term models recognize these relationships and use weather and recent load growth trends as the primary variables in forecasting monthly energy sales.

Over time, demographic and economic factors such as population, employment, income, and technology influence the nature of the stock of electricity-using equipment, both in size and composition. Long-term forecasting models recognize the importance of these variables and include all or most of them in the formulation of long-term energy forecasts.

Relative energy prices also have an impact on electricity consumption. One important difference between the short-term and long-term forecasting models is their treatment of energy prices, which are only included in long-term forecasts. This approach makes sense because although consumers may suffer sticker shock from energy price fluctuations, there is little they can do to affect them in the short-term. They already own a refrigerator, furnace or industrial equipment that may not be the most energy-efficient model available. In the long term, however, these constraints are lessened as durable equipment is replaced and as price expectations come to fully reflect price changes.

2.4.2 Customer Forecast Models

The Company also utilizes both short-term and long-term models to develop the final customer count forecast. The short-term customer forecast models are time series models with intervention (when needed) using Autoregressive Integrated Moving Average (ARIMA) methods of estimation. These models typically extend for 24 months into the forecast horizon.

The long-term residential customer forecasting models are also monthly but extend for 30 years. The explanatory economic and demographic variables include population and households used in various combinations for each jurisdiction. In addition to the economic explanatory variables, the long-term customer models employ a lagged dependent variable to capture the adjustment of customer growth to changes in the economy. There are also binary variables to capture monthly variations in customers, unusual data points and special occurrences.

The short-term and long-term customer forecasts are blended as was described earlier to arrive at the final customer forecast that will be used as a primary input into both short-term and long-term usage forecast models.

2.4.3 Short-term Forecasting Models

The goal of SWEPCO's short-term forecasting models is to produce an accurate load forecast for the first full year into the future. To that end, the short-term forecasting models generally employ a combination of monthly and seasonal binaries, time trends, and monthly heating cooling degree-days in their formulation. The heating and cooling degree-days are measured at weather stations in the Company's service area. The forecasts relied on ARIMA models.

There are separate models for the Arkansas, Louisiana and Texas Jurisdictions of the Company. The estimation period for the short-term models was January 2009 through January 2019.

2.4.3.1 Residential and Commercial Energy Sales

Residential and commercial energy sales are developed using ARIMA models to forecast usage per customer and number of customers. The usage models relate usage to lagged usage, lagged error terms, heating and cooling degree-days and binary variables. The customer models relate customers to lagged customers, lagged error terms and binary variables. The energy sales forecasts are a product of the usage and customer forecasts.

2.4.3.2 Industrial Energy Sales

Short-term industrial energy sales are forecast separately for 20 large industrial customers in SWEPCO and for the remainder of industrial energy. These short-term industrial energy sales models relate energy sales to lagged energy sales, lagged error terms and binary variables for each of the Company's jurisdictions. The industrial models are estimated using ARIMA models. The short-term industrial energy sales forecast is a sum of the forecasts for the 20 large industrial customers and the forecasts for the remainder of the manufacturing customers. Customer service engineers also provide input into the forecast for specific large customers.

2.4.3.3 All Other Energy Sales

The All Other Energy Sales category for SWEPCO includes public street and highway lighting (or other retail sales) and sales to municipals. Current SWEPCO wholesale requirements customers include the cities of Bentonville, Hope and Prescott in Arkansas, City of Minden in Louisiana, Northeast Texas Electric Cooperative, and Rayburn County Electric Coop. Figures from 2017 and prior years also include East Texas Electric Cooperative and Tex-La Electric Reliability Cooperative. Wholesale loads are generally longer term, full requirements, and cost-of-service based contracts.

Both the other retail and municipal models are estimated using ARIMA models. SWEPCO's short-term forecasting model for Public Street and highway lighting energy sales includes binaries, and lagged energy sales. The sales-for-resale model includes binaries, heating and cooling degree-days, lagged error terms and lagged energy sales.

Off-system sales and/or sales of opportunity are not relevant to the net energy requirements forecast, as they are not requirements load or part of the IRP process.

2.4.4 Long-term Forecasting Models

The goal of the long-term forecasting models is to produce a reasonable load outlook for up to 30 years in the future. Given that goal, the long-term forecasting models employ a full range of structural economic and demographic variables, electricity and natural gas prices, weather as measured by monthly heating and cooling degree-days, and binary variables to produce load forecasts conditioned on the outlook for the U.S. economy, for the SWEPCO service-area economy, and for relative energy prices.

Most of the explanatory variables enter the long-term forecasting models in a straightforward, untransformed manner. In the case of energy prices, however, it is assumed, consistent with economic theory, that the consumption of electricity responds to changes in the price of electricity or substitute fuels with a lag, rather than instantaneously. This lag occurs for reasons having to do with the technical feasibility of quickly changing the level of electricity use even after its relative price has changed, or with the widely accepted belief that consumers make their consumption decisions on the basis of expected prices, which may be perceived as functions of both past and current prices.

There are several techniques, including the use of lagged price or a moving average of price that can be used to introduce the concept of lagged response to price change into an econometric model. Each of these techniques incorporates price information from previous periods to estimate demand in the current period.

The general estimation period for the long-term load forecasting models was 1995-2018 The long-term energy sales forecast is developed by blending of the short-term forecast with the long-term forecast. The energy sales forecast is developed by making a billed/unbilled adjustment to derive billed and accrued values, which are consistent with monthly generation.

2.4.4.1 Supporting Models

In order to produce forecasts of certain independent variables used in the internal energy requirements forecasting models, several supporting models are used, including a natural gas price model for SWEPCO's Arkansas, Louisiana and Texas service areas. These models are discussed below.

2.4.4.1.1 Consumed Natural Gas Pricing Model

The forecast price of natural gas used in the Company's energy models comes from a model of state natural gas prices for four primary consuming sectors: residential, commercial, and industrial. In the state natural gas price models, sectoral prices are related to West South Central Census region's sectorial prices, with the forecast being obtained from EIA's "2019 Annual Energy Outlook." The natural gas price model is based upon 1980-2018 historical data.

2.4.4.2 Residential Energy Sales

Residential energy sales for SWEPCO are forecasted using two models, the first of which projects the number of residential customers, and the second of which projects kWh usage per customer. The residential energy sales forecast is calculated as the product of the corresponding customer and usage forecasts.

The residential usage model is estimated using a Statistically Adjusted End-Use model (SAE), which was developed by Itron, a consulting firm with expertise in energy modeling. This model assumes that use will fall into one of three categories: heat, cool and other. The SAE model constructs variables to be used in an econometric equation where residential usage is a function of Xheat, Xcool and Xother variables.

The Xheat variable is derived by multiplying a heating index variable by a heating use variable. The heating index incorporates information about heating equipment saturation; heating equipment efficiency standards and trends; and thermal integrity and size of homes. The heating use variable is derived from information related to billing days, heating degree-days, household size, personal income, gas prices and electricity prices.

The Xcool variable is derived by multiplying a cooling index variable by a cooling use variable. The cooling index incorporates information about cooling equipment saturation; cooling equipment efficiency standards and trends; and thermal integrity and size of homes. The cooling use variable is derived from information related to billing days, heating degree-days, household size, personal income, gas prices and electricity prices.

The Xother variable estimates the non-weather sensitive sales and is similar to the Xheat and Xcool variables. This variable incorporates information on appliance and equipment saturation levels; average number of days in the billing cycle each month; average household size; real personal income; gas prices and electricity prices.

The appliance saturations are based on historical trends from SWEPCO's residential customer survey. The saturation forecasts are based on EIA forecasts and analysis by Itron. The efficiency trends are based on DOE forecasts and Itron analysis. The thermal integrity and size of homes are for the West South Central Census Region and are based on DOE and Itron data.

The number of billing days is from internal data. Economic and demographic forecasts are from Moody's Analytics and the electricity price forecast is developed internally.

The SAE residential models are estimated using linear regression models. These monthly models are typically for the period January 1995 through January 2019. It is important to note, as will be discussed later in this document, that this modeling *has* incorporated the reductive effects of the Energy Policy Act of 2005 (EPAct), the Energy Independence and Security Act of 2007 (EISA), American Recovery and Reinvestment Act of 2009 (ARRA) and Energy Improvement and Extension Act of 2008 (EIEA2008) on the residential (and commercial) energy usage.

The long-term residential energy sales forecast is derived by multiplying the "blended" customer forecast by the usage forecast from the SAE model.

Separate residential SAE models are estimated for the Company's Arkansas, Louisiana and Texas jurisdictions.

2.4.4.3 Commercial Energy Sales

Long-term commercial energy sales are forecast using a SAE model. These models are similar to the residential SAE models, where commercial usage is a function of Xheat, Xcool and Xother variables.

As with the residential model, Xheat is determined by multiplying a heating index by a heat use variable. The variables incorporate information on heating degree-days, heating equipment saturation, heating equipment operating efficiencies, square footage, average number of days in a billing cycle, commercial output and electricity price.

The Xcool variable uses measures similar to the Xheat variable, except it uses information on cooling degree-days and cooling equipment, rather than those items related to heating load.

The Xother variable measures the non-weather sensitive commercial load. It uses non-weather sensitive equipment saturations and efficiencies, as well as billing days, commercial output and electricity price information.

The saturation, square footage and efficiencies are from the Itron base of DOE data and forecasts. The saturations and related items are from EIA's 2018 Annual Energy Outlook. Billing days and electricity prices are developed internally. The commercial output measure is either service gross regional product, service area real personal income per capita or service area commercial employment from Moody's Analytics. The equipment stock and square footage information are for the West South Central Census Region.

The SAE is a linear regression for the period, which is typically January 2000 through January 2019. As with the residential SAE model, the effects of EPAct, EISA, ARRA and EIEA2008 are captured in this model. Separate commercial SAE models are estimated for the Company's Arkansas, Louisiana and Texas jurisdictions.

2.4.4.4 Industrial Energy Sales

The Company uses some combination of the following economic and pricing explanatory variables: service area gross regional product manufacturing, service area manufacturing employment, FRB industrial production indexes, service area industrial electricity prices and state industrial natural gas price. In addition, binary variables for months are special occurrences and are incorporated into the models. Based on information from customer service engineers, there may be load added or subtracted from the model results to reflect plant openings, closures or load adjustments. Separate models are estimated for the Company's Arkansas, Louisiana and Texas jurisdiction. The last actual data point for the industrial energy sales models is January 2019.

2.4.4.5 All Other Energy Sales

The forecast of public-street and highway lighting relates energy sales to either service area employment or service area population and binary variables.

The municipal energy sales model is specified linear with the dependent and independent variables in linear form. Wholesale energy sales are modeled relating energy sales to economic variables such as service area gross regional product, heating and cooling degree-days and binary variables. Binary variables are necessary to account for discrete changes in energy sales that result from events such as the addition of new customers. The long-term forecast reflects the effects of two wholesale contracts that expired December 31st, 2017 and one contract being terminated by 2020.

2.4.5 Final Monthly Internal Energy Forecast

2.4.5.1 Blending Short and Long-Term Sales

Forecast values for 2019 and 2020 are taken from the short-term process. Forecast values for 2021 are obtained by blending the results from the short-term and long-term models. The blending process combines the results of the short-term and long-term models by assigning weights to each result and systematically changing the weights so that by July of 2021, the entire forecast is from the long-term models. The goal of the blending process is to leverage the relative strengths of the short-term and long-term models to produce the most reliable forecast possible. However, at times the short-term models may not capture structural changes in the economy as well as the long-term models, which may result in the long-term forecast being used for the entire forecast horizon.

2.4.5.2 Large Customer Changes

The Company's customer service engineers are in continual contact with the Company's large commercial and industrial customers about their needs for electric service. These customers relay information about load additions and reductions. This information will be compared with the load forecast to determine if the industrial or commercial models are adequately reflecting these changes. If the changes are different from the model results, then add factors may be used to reflect those large changes that are different from those from the forecast models' output.

2.4.5.3 Losses and Unaccounted-For Energy

Energy is lost in the transmission and distribution of the product. This loss of energy from the source of production to consumption at the premise is measured as the average ratio of all FERC revenue class energy sales measured at the premise meter to the net internal energy requirements metered at the source. In modeling, Company loss study results are applied to the final blended sales forecast by revenue class and summed to arrive at the final internal energy requirements forecast.

2.4.6 Forecast Methodology for Seasonal Peak Internal Demand

The demand forecast model is a series of algorithms for allocating the monthly internal energy sales forecast to hourly demands. The inputs into forecasting hourly demand are blended revenue class sales, energy loss multipliers, weather, 24-hour load profiles and calendar information.

The weather profiles are developed from representative weather stations in the service area. Twelve monthly profiles of average daily temperature that best represent the cooling and heating degree-days of the specific geography are taken from the last 30 years of historical values. The consistency of these profiles ensures the appropriate diversity of the company loads.

The 24-hour load profiles are developed from historical hourly company or jurisdictional load and end-use or revenue class hourly load profiles. The load profiles were developed from segregating, indexing and averaging hourly profiles by season, day types (weekend, midweek and Monday/Friday) and average daily temperature ranges.

In the end, the profiles are benchmarked to the aggregate energy and seasonal peaks through the adjustments to the hourly load duration curves of the annual 8,760 hourly values. These 8,760 hourly values per year are the forecast load of SWEPCO and the individual companies of AEP that can be aggregated by hour to represent load across the spectrum from end-use or revenue classes to total AEP-East, AEP-West (SPP), or total AEP system. Net internal energy requirements are the sum of these hourly values to a total company energy need basis. Company peak demand is the maximum of the hourly values from a stated period (month, season or year).

2.5 Load Forecast Results and Issues

All tables referenced in this section of the report can be found in the appendix of this report in Exhibit A.

2.5.1 Load Forecast

Table A-1 presents SWEPCO's annual internal energy requirements, disaggregated by major category (residential, commercial, industrial, other retail and wholesale sales, as well as losses) on an actual basis for the years 2009-2018. 2019 data are six months actual and six months forecast and on a forecast basis for the years 2020-2039. The exhibit also shows annual growth rates for both the historical and forecast periods. Corresponding retail sales information for the Company's Arkansas, Louisiana and Texas retail service areas are given in Table A-2.

Figure 3 below provides a graphical depiction of weather normal and forecast Company residential, commercial and industrial sales for 2002 through 2039.

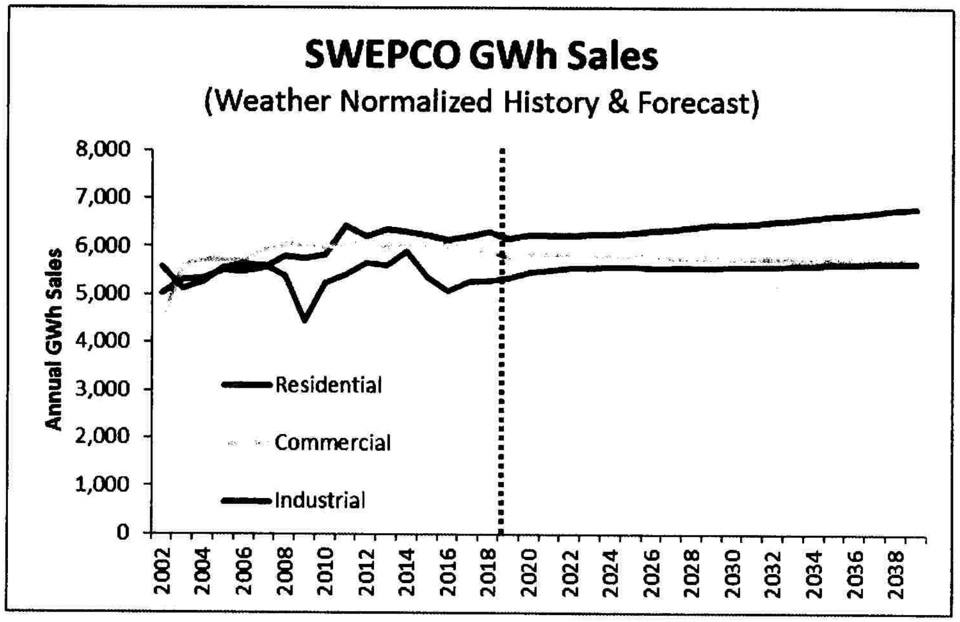

Figure 3. SWEPCO GWh Sales

2.5.2 Peak Demand and Load Factor

Table A-3 provides SWEPCO's seasonal peak demands, annual peak demand, internal energy requirements and annual load factor on an actual basis for the years 2009-2018. 2019 data are six months actual and six months forecast and on a forecast basis for the year 2020-2039. The table also shows annual growth rates for both the historical and forecast periods.

Figure 4 presents actual, weather normal and forecast PSO peak demand for the period 2000 through 2039.

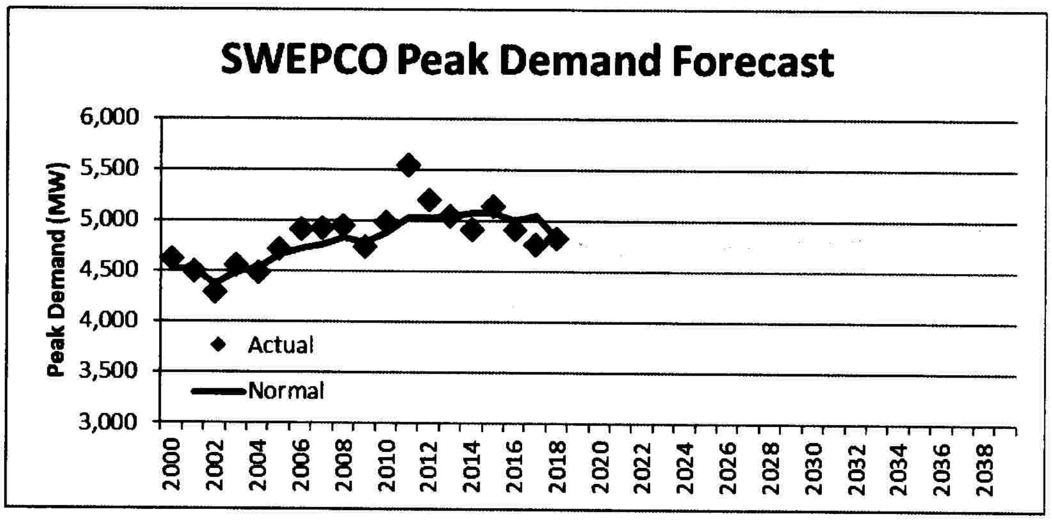

Figure 4: SWEPCO Peak Demand Forecast

2.5.3 Monthly Data

Table A-4 provides historical monthly sales data for SWEPCO by customer class (residential, commercial, industrial, other retail and wholesale) for the period January 2009 through June 2019. Table A-5 provides forecast SWEPCO monthly sales data by customer class for July 2019 through December 2039.

2.5.4 Prior Load Forecast Evaluation

Table A-6 presents a comparison of SWEPCO's energy sales and peak demand forecasts in the 2015 IRP with the actual and weather normal data for 2015, 2016, 2017 and 2018. The primary reason for the forecast differences is that the SWEPCO service area economy did not expand as quickly as was expected when the load forecast used in the previous (2015) IRP was developed. In fact, the SWEPCO service area experienced year-over-year contractions in real output from the third quarter in 2015 through the second quarter in 2016. On a regional level, real GDP was expected to grow at 3.3%, 3.5%, 2.6% and 2.0% in 2015, 2016, 2017 and 2018, respectively. Meanwhile, real GDP grew by 1.0% in 2015, declined by 0.4% in 2016, grew by

2.3% in 2017 and grew by 2.6% in 2018. The 2018 wholesale anticipated some departure of wholesale load that materialize to the level expected. As the sluggish economy was seen as the primary reason for the forecast differences, there were no significant changes to the forecast model structures. However, there is a constant monitoring of the modeling process to seek improvement in forecast accuracies. Table A-7 provides the impact of demand-side management on the 2015 IRP.

2.5.5 Weather Normalization

The load forecast presented in this report assumes normal weather. To the extent that weather is included as an explanatory variable in various short- and long-term models, the weather drivers are assumed to be normal for the forecast period.

2.5.6 Significant Determinant Variables

Table A-8 provides significant economic and demographic variables incorporated in the various residential long-term energy sales models for the Company. Table A-9 provides significant economic variables utilized in the various SWEPCO jurisdictional commercial energy sales models. Table A-10 presents significant economic variables that the Company employed in its jurisdictional industrial models. Table A-11 depicts the significant economic variables the Company incorporated in its other retail and wholesale energy sales models.

2.6 Load Forecast Trends & Issues

2.6.1 Changing Usage Patterns

Over the past decade, there has been a significant change in the trend for electricity usage from prior decades. Figure 5 presents SWEPCO's historical and forecasted residential and commercial usage per customer between 1991 and 2025. During the first decade shown (1991-2000), Residential usage per customer grew at an average rate of 1.4% per year while the Commercial usage grew by 2.1% per year. Over the next decade (2001-2010), growth in Residential usage slowed to 0.5% per year while the Commercial class usage increased by 0.9% per year. For the last decade shown (2011-2020) Residential usage is projected to decline at a rate of 0.7% per year while the Commercial usage also falls by an average of 0.7% per year. This decline is expected to moderate for the last 5 years shown (2021-2025), with residential usage declining at a rate of 0.1% per year while commercial usage falls by 0.5%.

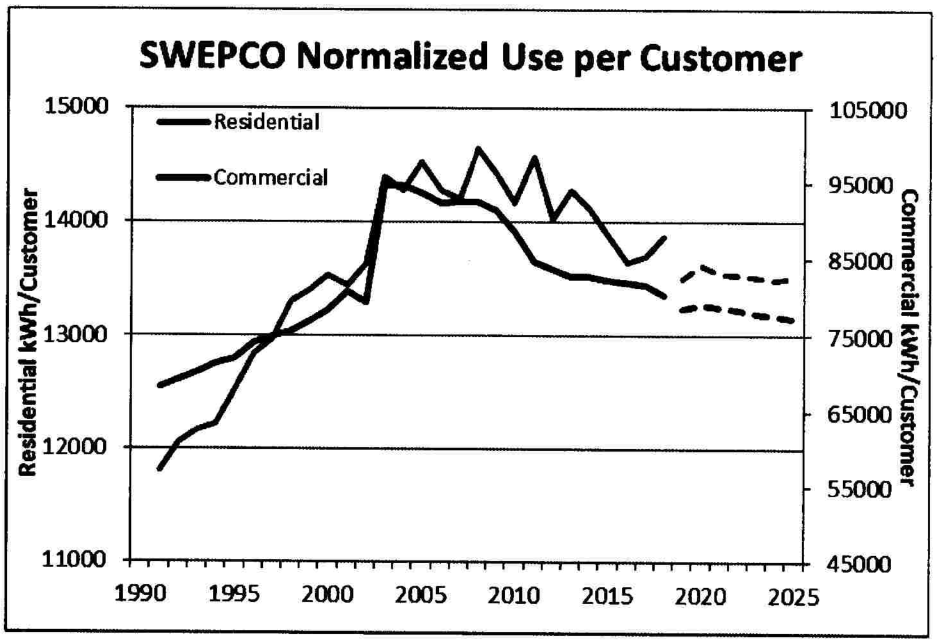

Figure 5. SWEPCO Normalized Use per Customer (kWh)

The statistically adjusted end-use models are designed to account for changes in the saturations and efficiencies of the various end-use appliances. Every 3-4 years, the Company conducts a Residential Appliance Saturation Survey to monitor the saturation and age of the various appliances in the residential home. This information is then matched up with the saturation and efficiency projections from the EIA, which includes the projected impacts from the various enacted federal policy mentioned earlier.

The result of this is a base load forecast that already includes some significant reductions in usage as a result of projected energy efficiency. For example, Figure 6 below shows the assumed cooling efficiencies embedded in the statistically adjusted end-use models for cooling loads. It shows that the average Seasonal Energy Efficiency Ratio (SEER) for central air conditioning is projected to increase from 11.69 in 2010 to nearly 14.4 by 2035. The chart shows a similar trend in projected cooling efficiencies for heat pump cooling as well as room air conditioning units as well.

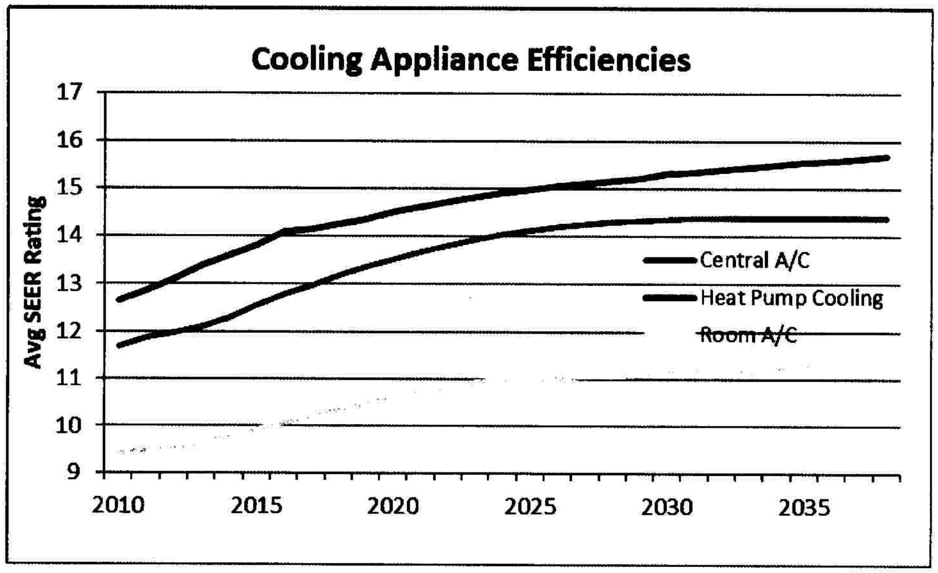

Figure 6. Projected Changes in Cooling Efficiencies, 2010-2038

Figure 7 below shows the impact of appliance, equipment and lighting efficiencies on the Company's weather normal residential usage per customer. This graph provides weather normalized residential energy per customer and an estimate of the effects of efficiencies on usage. In addition, historical and forecast of SWEPCO residential customers are provided.

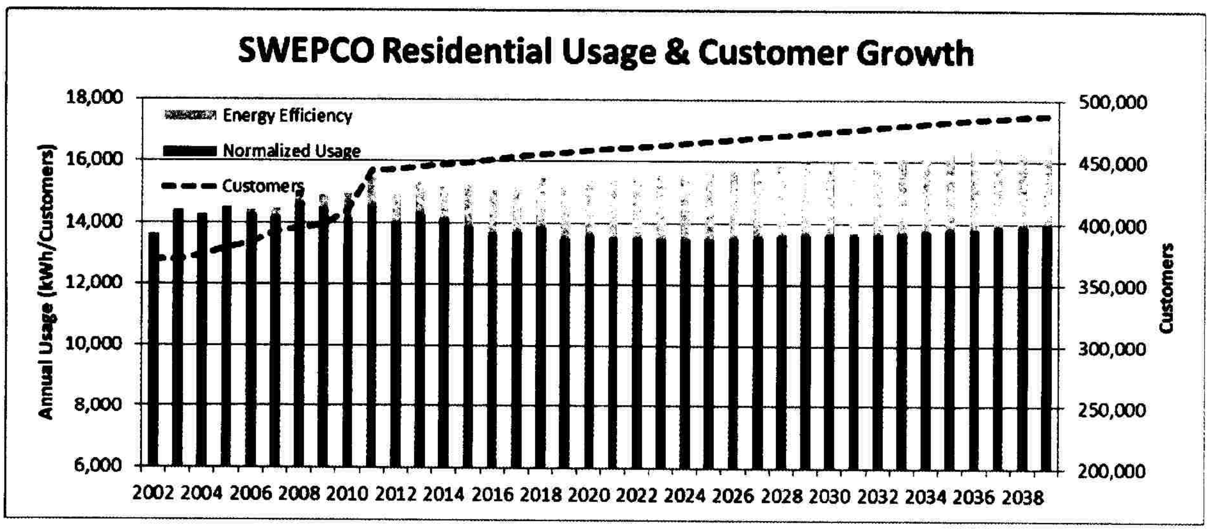

Figure 7. Residential Usage and Customer Growth, 2002-2038

2.6.2 Demand-Side Management (DSM) Impacts on the Load Forecast

Table A-12 provides the DSM/EE impacts incorporated in SWEPCO's load forecast provided in this report. Annual energy and seasonal peak demand impacts are provided for the Company and its Louisiana jurisdiction.

2.6.3 Losses and Unaccounted for Energy

Actual and forecast losses and unaccounted for energy are provided in Table A-13. See Section 2.4.5.3 for a discussion of loss estimation. At this time, the Company does not have any planned loss reduction programs.

2.6.4 Interruptible Load

The Company has 25 customers with interruptible provisions in their contracts. The aggregate on-peak capacity available for interruptions is 35.6MW. The load forecast does not reflect any load reductions for these customers. Rather, the interruptible load is seen as a resource when the Company's load is peaking. As such, estimates for "demand response" impacts are reflected by SWEPCO in determination of SPP-required resource adequacy (i.e., SWEPCO's projected capacity position).

2.6.5 Blended Load Forecast

As noted above, at times the short-term models may not capture structural changes in the economy as well as the long-term models, which may result in the long-term forecast being used for the entire forecast horizon. Table A-14 provides an indication of which retail models are blended and which strictly use the long-term model results. In addition, seven of the nine wholesale forecasts utilize the long-term forecast model results and the other two uses the blended model results.

In general, forecast values for the year 2019 were typically taken from the short-term process. Forecast values for 2021 are obtained by blending the results from the short-term and long-term models. The blending process combines the results of the short-term and long-term models by assigning weights to each result and systematically changing the weights so that by July 2021 the entire forecast is from the long-term models. This blending allows for a smooth transition between the two separate processes, minimizing the impact of any differences in the results. Figure

8 illustrates a hypothetical example of the blending process (details of this illustration are shown in Table A-15). However, in the final review of the blended forecast, there may be instances where the short-term and long-term forecasts diverge especially when the long-term forecast incorporates a structural shift in the economy that is not included in the short-term models. In these instances, professional judgment is used to develop the most reasonable forecast.

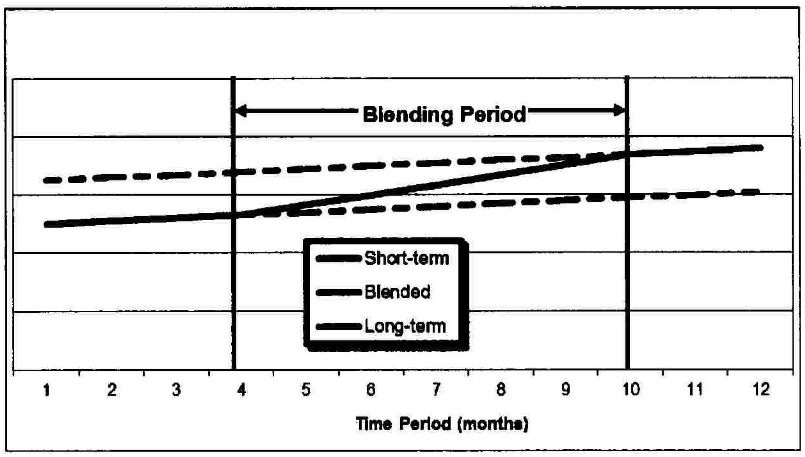

Figure 8. Load Forecast Blending Illustration

2.6.6 Large Customer Changes

The Company's customer service engineers are in continual contact with the Company's large commercial and industrial customers about their needs for electric service. These customers will relay information about load additions and reductions. This information will be compared with the load forecast to determine if the industrial or commercial models are adequately reflecting these changes. If the changes are different from the model results, then add factors may be used to reflect those large changes that are different from those from the forecast models' output.

2.6.7 Wholesale Customer Contracts

Company representatives are in continual contact with wholesale customer representatives about their contractual needs. If a wholesale customer intends to seek bids for the supply of power, they typically would need to give the Company a five year notice of such intentions, although there may be stipulations within a contract that permits the customer to do so earlier. Within the context of these two items, the Company has one wholesale customer with a "full requirements" load contract that will expire by 2020. The load for this wholesale customer has been removed from the load forecast at the appropriate date. Concurrently, any self-generation provided by those wholesale customers that is appropriately "assumed" by SWEPCO for purposes of its long-term resource planning has been likewise removed.

2.7 Load Forecast Model Documentation

Full documentation of the short- and long-term load forecasts are provided in non-confidential and confidential accompanying CDs. Included in the CDs are model input data, model estimation and statistics and model output. In addition, descriptions of the SAE models are provided.

2.8 Load Forecast Scenarios

The base case load forecast is the expected path for load growth that the Company uses for planning. There are a number of known and unknown potentials that could drive load growth different from the base case. While potential scenarios could be quantified at varying levels of assumptions and preciseness, the Company has chosen to frame the possible outcomes around the base case. The Company recognizes the potential desire for a more exact quantification of outcomes, but the reality is if all possible outcomes were known with a degree of certainty, then they would become part of the base case.

Forecast sensitivity scenarios have been established which are tied to respective high and low economic growth cases. The high and low economic growth scenarios are consistent with scenarios laid out in the EIA's 2019 Annual Outlook. While other factors may affect load growth, this analysis only considered high and low economic growth. The economy is seen as a crucial factor affecting future load growth.

The low-case, base-case and high-case forecasts of summer and winter peak demands and total internal energy requirements for SWEPCO are tabulated in Exhibit A-16.

For SWEPCO, the low-case and high-case energy and peak demand forecasts for the last forecast year, 2039, represent deviations of about 15.0% below and 14.9% above, respectively, the base-case forecast.

During the load forecasting process, the Company developed various other scenarios. Figure 9 provides a graphical depiction of the scenarios developed in conjunction with the load provided in this report.

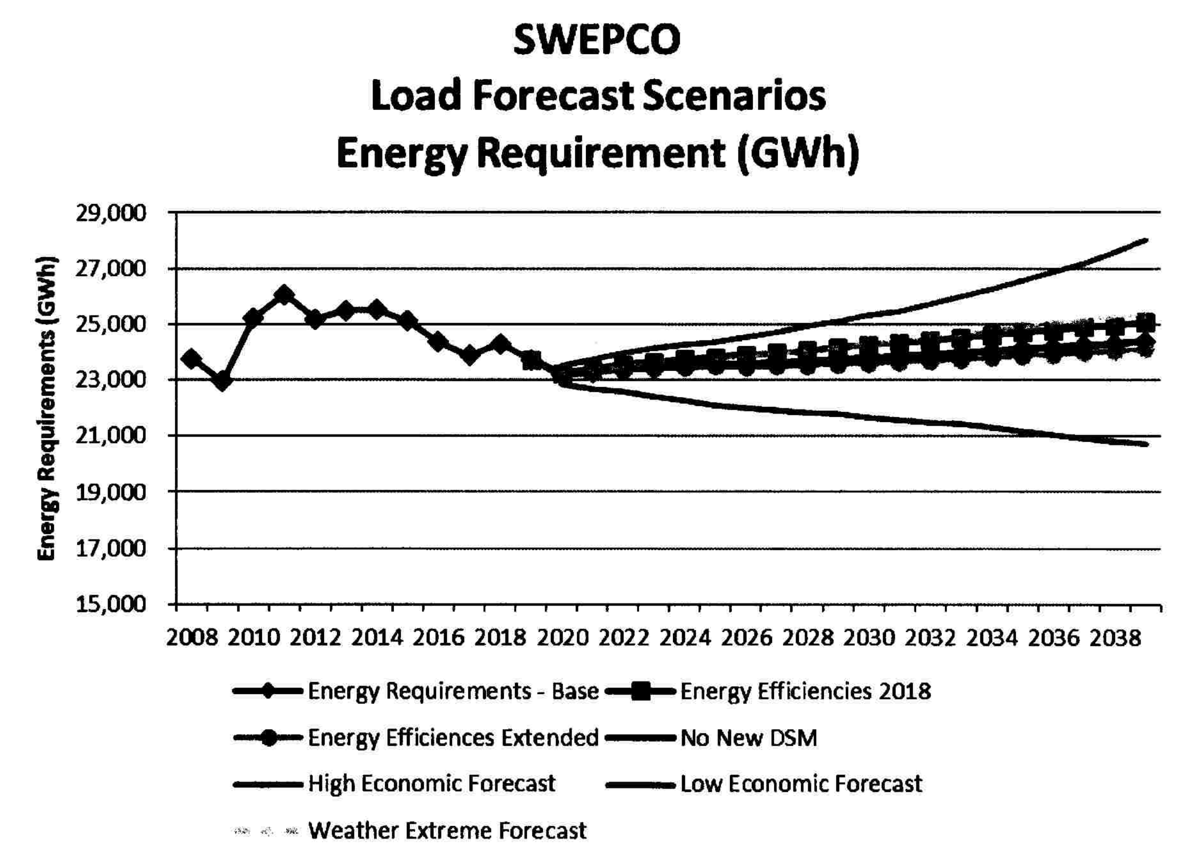

Figure 9. Load Forecast Scenarios

The no new DSM scenario extracts the DSM included in the load forecast and provides what load would be without the increased DSM activity. The energy efficiencies 2019 scenario keeps energy efficiencies at 2019 levels for the residential and commercial equipment. Both of these scenarios result in a load forecast greater than the base forecast.

The energy efficiencies extended scenario has energy efficiencies developing at a faster pace than is represented in the base forecast. This scenario is based on analysis developed by the Energy Information Administration. This forecast is lower than the base forecast due to enhanced energy efficiency for residential and commercial equipment.

The weather extreme forecast assumes increased average daily temperatures for both the winter and summer seasons, which results in diminished heating degree-days in the winter and increased cooling degree-days in the summer. This analysis is based on a potential impact of climate change developed by Purdue University. This scenario results in increased load in the summer and diminished load in the winter, with the net result being a higher energy requirements forecast. Exhibit A-17 provides graphical displays of the range of forecasts of summer and winter peak demand for SWEPCO along with the impacts of the weather scenario for each season.

All of these alternative scenarios fall within the boundary of the Company's high and low economic scenario forecasts. The Company's expectations are that any reasonable scenario developed will fall within this range of forecasts.

3.0 Resource Evaluation

3.1 Current Resources

An initial step in the IRP process is the demonstration of the capacity resource requirements. This aspect of the traditional "needs" assessment must consider projections of:

- existing capacity resources—current levels and anticipated changes;
- anticipated changes in capability due to efficiency and/or environmental considerations;
- changes resulting from decisions surrounding unit disposition evaluations;
- regional and sub-regional capacity and transmission constraints/limitations;
- load and peak demand;
- current DR/EE; and
- SPP capacity reserve margin and reliability criteria.

3.2 Existing SWEPCO Generating Resources

The underlying minimum reserve margin criterion to be utilized in SWEPCO's resource needs assessment is based on the current SPP minimum capacity margin of 10.7 percent.[4] As a function of peak demand this converts to an equivalent "reserve margin" of 12.0 percent.[5] The reserve margin is the result of SPP's own system reliability assessment. Table 1 displays key parameters for SWEPCO's current supply-side resources.

[4] Per Section 4.1.9 of the "Southwest Power Pool Planning Criteria" (Latest Revision: July 25, 2017).

[5] $0.107 / (1 - 0.107) = 0.12$.

Table 1. Current Supply-Side Resources, as of June 2019

Plant	Unit	Output Net MW Capability	In-Service Year	Expected Useful Life	Primary Fuel	State	Retirement Date (1)
Arsenal Hill	5	110	1960	65	Natural Gas	LA	2025
Dolet Hills (2)	1	650**	1986	60	Lignite	LA	2046
Flint Creek	1	528*	1978	60	Coal	AR	2038
Knox Lee	2	30	1950	69	Natural Gas	TX	2020
Knox Lee	3	31	1952	67	Natural Gas	TX	2020
Knox Lee	5	348	1974	65	Natural Gas	TX	2039
Lieberman	2	26	1949	70	Natural Gas	LA	2019
Lieberman	3	109	1957	65	Natural Gas	LA	2022
Lieberman	4	108	1959	65	Natural Gas	LA	2024
Lone Star	1	50	1954	65	Natural Gas	TX	2019
Mattison	1	76	2007	45	Natural Gas (CT)	AR	2052
Mattison	2	76	2007	45	Natural Gas (CT)	AR	2052
Mattison	3	76	2007	45	Natural Gas (CT)	AR	2052
Mattison	4	76	2007	45	Natural Gas (CT)	AR	2052
Pirkey	1	675***	1985	60	Lignite	TX	2045
Stall	6A, 6B, 6S	511	2010	40	Natural Gas (CC)	LA	2050
Turk	1	650	2012	55	Coal	AR	2067
Welsh	1	528	1977	60	Coal	TX	2037
Welsh	3	528	1982	60	Coal	TX	2042
Wilkes	1	177	1964	65	Natural Gas	TX	2029
Wilkes	2	362	1970	65	Natural Gas	TX	2035
Wilkes	3	362	1971	65	Natural Gas	TX	2036
Majestic	1	80 (A)	2009		Wind (PPA)	TX	2029
High Majestic	1	80 (A)	2012		Wind (PPA)	TX	2032
Flat Ridge	1,2	109 (A)	2013		Wind (PPA)	KS	2032
Canadian Hills	1,2,3	201 (A)	2012		Wind (PPA)	OK	2032

* SWEPCO's Share is 264 MW
** SWEPCO's Share is 262 MW
*** SWEPCO's Share is 580 MW
(1) Based on the latest Commission approved depreciation rates in the respective SWEPCO state jurisdictions.
(2) Dolet Hills has transitioned to seasonal operations and the Company is continuing to evaluate operations.

For purposes of establishing a modeling "baseline," it is necessary to establish assumptions pertaining to all of the capacity and energy resources available to SWEPCO. Figure 10 depicts SWEPCO's current generation resources along with their current age. For IRP purposes, each generating unit has an assumed planned retirement date based on the latest Commission approved depreciation rates in the respective SWEPCO state jurisdictions, which is shown in Table 1 and reflected in the Capacity, Demand, and Reserves summary (CDR) found in Exhibit F of the appendix. As depicted in the figure, the gas-steam units are the oldest units on the