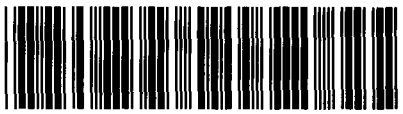

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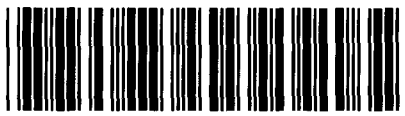

Item Number: 126

Addendum StartPage: 0

SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR CERTIFICATE OF CONVENIENCE AND NECESSITY AUTHORIZATION AND RELATED RELIEF FOR THE ACQUISITION OF WIND GENERATION FACILITIES	**§**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

OCTOBER 7, 2019

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SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737

SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-1:

Please explain how the capacity value benefits were determined and provide workpapers showing how the benefits were calculated.

a. Provide the capacity rate ($/MW) by year and explain how these rates were determined along with supporting documents.

b. Provide the capacity units used to determine the capacity savings for the No Project and With Project cases.

Response No. TIEC 4-1:

a. See pages 19 and 20 of Company witness Torpey's testimony for a description of how capacity value was determined. A "capacity rate" was not used. Capacity value was obtained by deferring additions of other capacity to later years and/or adding cheaper capacity because of the addition of this capacity. This savings to customers from delaying when they would start paying for future capacity additions in their rates is the capacity value benefit.

   The Company used the long-term capacity planning module of the PLEXOS model to determine the optimal portfolio of future resource additions for each fundamental pricing scenario, with and without the proposed wind facilities. The model was allowed to select CC's, CT's, solar, or short term market capacity purchases depending on which combination of resources led to the lowest NPV of capacity and energy costs over the planning horizon through 2051. The model also included future wind from SWEPCO's IRP. The model computes the capital carrying cost and O&M associated with each option and that was then included in witness Torpey's workpapers. See the SWEPCO files for each fundamental case in the "Capacity Benefits" folder included in Supplemental Attachment 1 to the Company's supplemental response to TIEC 1-19. These total annual costs for each case were then transferred over to the Inputs worksheet in the file "Torpey Errata Benefits Model Final" included in TIEC 1-19 Supplemental Attachment 1, and then referenced over to witness Torpey's benefits cases on the "SWEPCO Exhibits" worksheet in that model. This sheet is witness Torpey's Errata Exhibit JFT-3.

b. See the SWEPCO files for each fundamental case in the "Capacity Benefits" folder included in Supplemental Attachment 1 to the Company's supplemental response to TIEC 1-19 which indicate the capacity units used to determine the capacity savings. In

the modeling described in item a) the Selected Wind Facilities were assumed to be credited with 123 MW of capacity by SPP, based on the recent guidance published by SPP. SPP is in the process of making changes to its method of accrediting capacity value to renewables, as described in Attachment 1 to this response. AEP assumed the 15.3% of nameplate for a Tier 2 resource in this proceeding, which is 123 MW. This is a conservative assumption based on current accreditation of its other wind resources and based on the methodology described in Attachment 1.

Prepared By: Paul N. Demmy	Title: Resource Planning Anlyst Sr
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Prepared By: James F. Martin	Title: Regulatory Case Mgr
Sponsored By: John F. Torpey	Title: Mng Dir Res Plnning&Op Anlysis

Allocation of Wind and Solar ELCC Accreditation

August 2019

SPP Southwest Power Pool

Revision History

August 18, 2019	Chris Haley	Wind and Solar Accreditation	Combining wind and solar accreditation policy

Southwest Power Pool, Inc.

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Southwest Power Pool, Inc.

1. Introduction

This white paper proposes a methodology for prioritizing and allocating the available effective load carrying capability (ELCC) from wind and solar generating facilities that qualify as capacity in the SPP Balancing Authority (BA). Because of wind and solar's intermittency, the capacity value or effective load carrying capability (ELCC) of wind and solar powered resources are lower than their nameplates indicate and will decrease as the penetration increases across the BA. As the penetration of increases, SPP and its members need to be aware of and understand the changing impact these resources have on the economics of resource adequacy and on the reliability of the system.

2. Background

Since 2004, when SPP originally adopted the criteria for the recommended methodology to evaluate the capability of wind and solar facilities, the wind penetration in the SPP region has increased substantially. The current criteria has been updated once during the past 15 years and this led to most wind facilities receiving more accreditation based on the amount of wind installed on the system at that time. The current criteria accredits wind and solar without any direct consideration of the existing total penetration in the region. As the penetration of wind and solar increases, there may be reliability impacts based on over stating the capacity accreditation of these resources.

The Supply Adequacy Working Group (SAWG) charter's scope of activities directs the SAWG to review the processes and requirements needed to maintain reliable supply adequacy in the SPP BA. One of those requirements is the accreditation methodology for resources and in late 2018, the SAWG directed SPP staff to review and research industry use of the Effective Load Carrying Capability (ELCC) methodology for intermittent resources. The goal was to determine if there was a reliability concern with the current criteria and how it measured up against the accreditation established based on the ELCC methodology. SPP staff completed a system-wide wind[1] and solar[2] analysis in 2019 and found that there was a measureable difference in the results between the two methodologies. The results of the ELCC Wind Study were significant enough for the SAWG in March 2019 to approve, via a straw poll, to use ELCC as the guiding principle for the accreditation of solar, wind and storage resources in the SPP Balancing Authority. This

[1] 2019 ELCC Wind Study Report
[2] Insert 2019 ELCC Solar Study Report here

move to ELCC will replace the current accreditation methodology found in section 7.1.6.1 (7) of the SPP Planning Criteria once new criteria language is approved.

3. ELCC Overview

ELCC is defined as the amount of incremental load a resource, in this case wind and solar, can dependably and reliably serve, while considering the probabilistic nature of generation shortfalls and random forced outages as driving factors to load not being served. ELCC is an industry wide accepted methodology used for determining the capacity value of resources and been in use for nearly half a century.[3]

The measurement of ELCC for both wind and solar resources is consistent, and is described in the following example using one wind scenario. To measure the ELCC of a particular resource, the reliability effects are isolated for the resource in question, from the other resources. This is accomplished by calculating the LOLE of two different cases: one with and one without the resource, as shown in Figure 1. Inherently, the case with the resource should be more reliable and consequently have fewer days per year of expected loss of load (smaller LOLE).

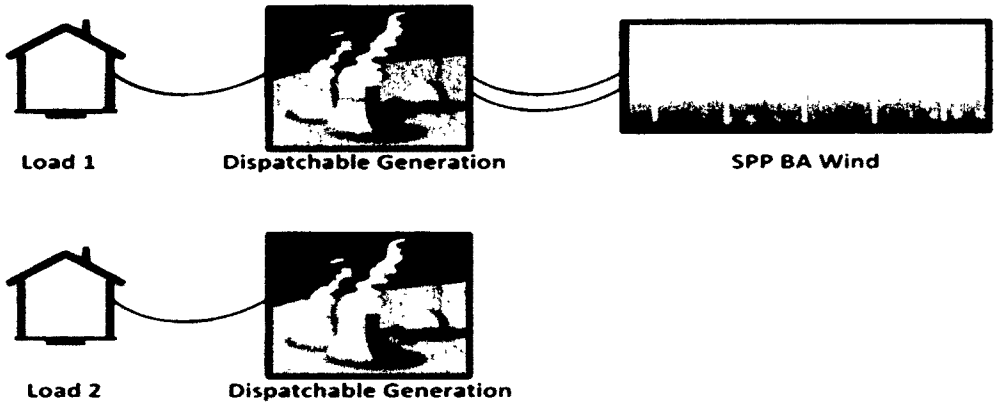

Figure 1: With and without the wind and solar resources

[3] ELCC has been used for determining capacity value of resources since the 1960's when Garver demonstrated the use of Loss of Load Probability (LOLP) in the calculation of ELCC (Section 2 of the 2019 ELCC Wind Study Report)

With each base system case being at the same reliability level, as shown in Figure 2, the only difference between the two cases is that the load was adjusted to meet a required LOLE metric of one day in 10 years. This difference in adjusted load is the amount of ELCC expressed in load or megawatts, which is done by subtracting Load 2 (58,757 MW) from Load 1(61,874 MW), and in this case equals 3,117 MW. This number (3,117) is divided by SPP wind capacity of 19,339 MW and expressed in percentage form. The wind resources in the ELCC example Fig. 2 have an ELCC of 16.1 percent of the resource's nameplate capacity.

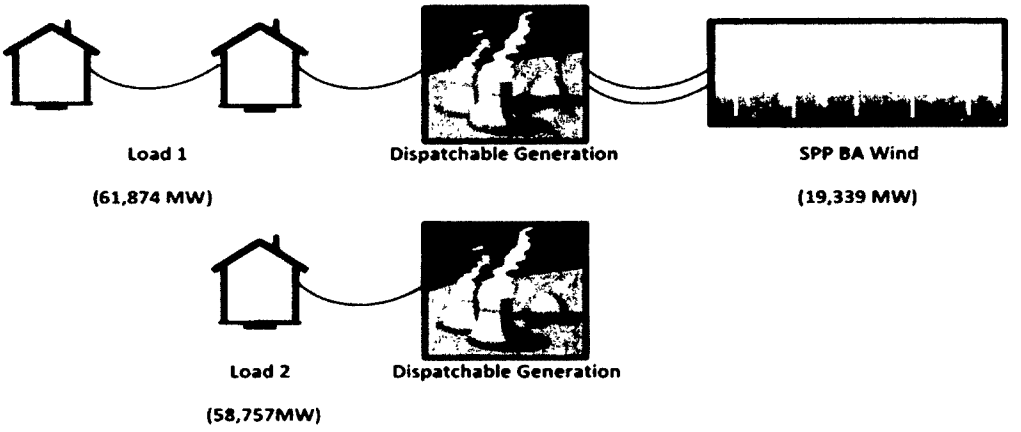

Figure 2: Differnce in load amounts

4. Results from the ELCC Wind Study

SPP Staff completed the ELCC Wind Study in early 2019 using SERVM software. The results of the ELCC Wind Study demonstrated that while the total capacity available from wind resources increases with penetration, the accredited percentage of capacity related to nameplate of each individual resource will decrease. This is illustrated in the Figure 3 below, which is taken from the ELCC Wind Study. The yellow line indicates the total capacity available from wind increases to 5,633 MW for an installed capacity of approximately 38,678 MWs. However, the ELCC of these resources decreases from 19.9% with 19,339 MW of wind to 14.6% with an installed capacity of 38,678 MW[4], for reference, the current SPP

[4] Reference Appendix C

accreditation methodology in Planning Criteria 7.1.6.1 is shown on the green line. The capacity value difference between the ELCC methodology and the current Planning Criteria is a potentially over-valuing approximately 5,000MW of accredited capacity for an installed wind fleet of 38,678 MW nameplate capacity

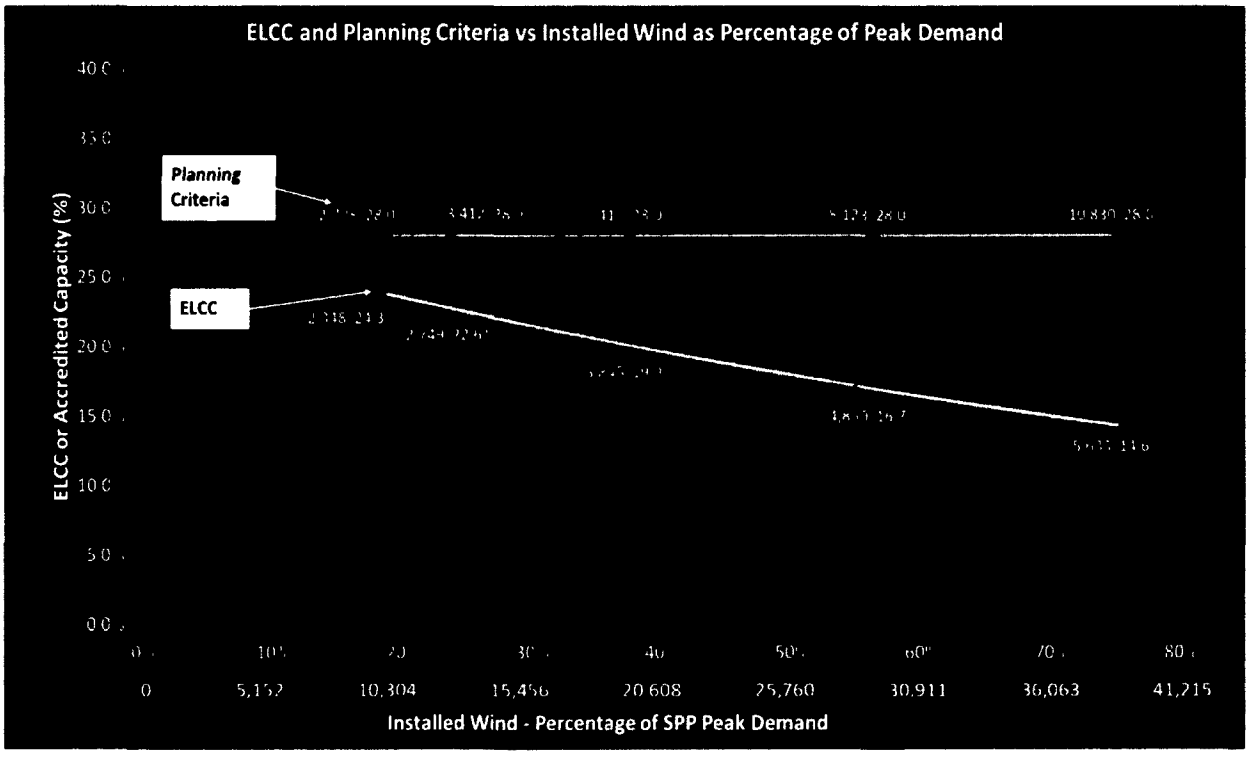

Figure 3: Methodology comparison between SPP Criteria and ELCC

5. Results from the ELCC Solar Study

SPP Staff completed the ELCC Solar Study in 2019 using SERVM software. The results of the ELCC Solar Study demonstrated that while the total capacity available from solar resources increases with penetration, the accredited percentage of capacity related to nameplate of each individual resource will decrease. This is illustrated in the Figure 4 below, which is taken from the ELCC Solar Study.

The yellow line indicates the total capacity available from solar increases to 6,200 MW for installed capacity of 40,000 MW. However, the ELCC accreditation percentage of the resources decreases from 62.4% with

4,282 MW of solar to 15.5% for 40,000 MW. For reference, the current SPP accreditation methodology in Planning Criteria 7.1.6.1 is shown on the green line with an accredited percentage of 60.7% for penetration levels above 1,000 MW, which stays consistent for any future level of penetration. Historical output from the installed existing solar facilities (215 MW) was used to determine the accredited capacity for both methods, ELCC and Planning Criteria. The additional amounts of solar penetration (1,000 MW and greater) utilized solar shapes from existing sites and additional potential sites based on the assumptions in Section **Error! Reference source not found.** of this report. The difference in assumptions (more diversity of solar sites including sites in the northern latitudes of SPP) causes the initial decrease in accredited percentage from 215 MW to 1,000 MW shown in Figure 4.

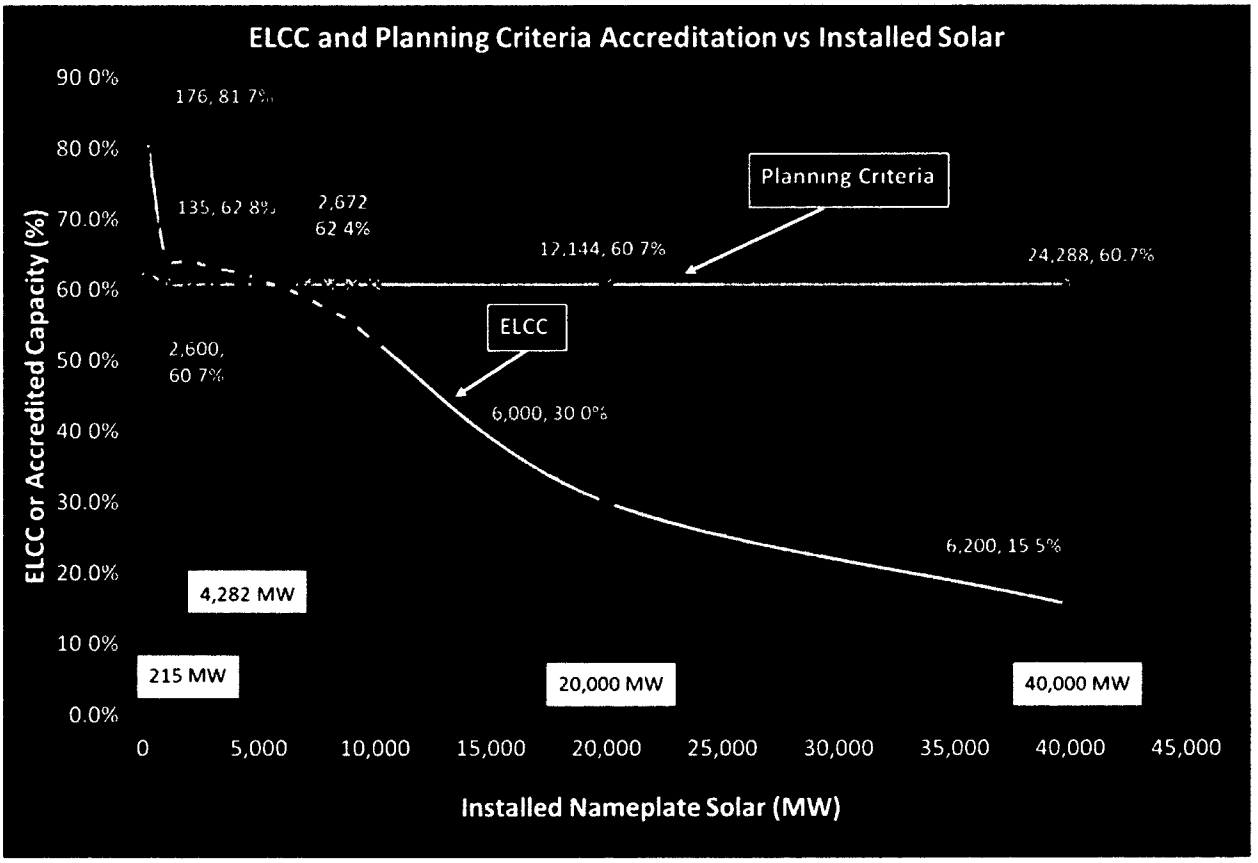

Figure 4: Methodology comparison between SPP Criteria and ELCC

In summary, the SPP ELCC solar analysis:

- Determined the ELCC accredited capacity of installed solar.

- Determined, based on actual and supplemental solar data used in the study, that as solar penetration increases there is a reliability concern that the current SPP Planning Criteria will over-value the accredited capacity of solar.
- Concluded that if wind and solar are analyzed together for the calculation and allocation of ELCC, there is a high possibility that solar resources could receive a portion of the combined ELCC accreditation that otherwise may have been allocated for wind. This is based on the current methodology allocating ELCC on the top 3% of load hours.

Based on this determination, SPP staff recommends that wind and solar be independently studied for the purposes of ELCC accreditation.

6. ELCC Allocation Guidelines

a. Study Priority

SPP staff will perform an annual ELCC[5] study on both the summer and winter seasons to determine the MW amount of accreditation that wind resources receive. As evidenced in Figure 3 and Figure 4, when wind and solar penetration is lower on the system, the ELCC accreditation tends to be of higher value on a percent of nameplate (MW). For this reason, wind and solar resources will be broken into two tiers based on the resource's ability to serve load. In Tier 1, all resources that are a Designated Resource on a Transmission Customer's Network Integration Transmission Service Agreement (NITSA) will have priority in the study queue and will have the ELCC capacity value determined first. Tier 1 resources will be studied at the firm service amount that has been assigned to the Designated Resource in the NITSA. For example, using wind data from Figure 3 above, if the Tier 1 consists of 12,185MW of wind resources, the Tier 1 resources will be assigned an ELCC value of 2,749MW. If Tier 1 resources do not have firm transmission service on the full contract or ownership amount, the remaining nameplate rating capability of the resource will be studied in Tier 2, as shown in Figure 5. Tier 2 will consist of all additional wind and the leftover MWs from Tier 1. Again, using wind data from Figure 3, if Tier 2 consisted of an additional 7,154MW, the ELCC value assigned to Tier 2 would be the difference of the calculated ELCC value of

[5] The ELCC study will piggyback off the latest LOLE study that was performed. The 2019 ELCC Wind and Solar Studies were based off the 2017 LOLE study assumptions.

3,845MW (value at 19,339MW of nameplate capability) less the value assigned to Tier 1 (2,749MW). The resulting value to Tier 2 is 1,096MW as shown in the Equation Example 1 below.

$$Nameplate\ Capacity = 19{,}339\ MW \text{ and } ELCC\ Accreditation = 3{,}845\ MW$$

$$Tier\ 1\ Capacity = 12{,}185\ MW \text{ and } ELCC\ Accreditation = 2{,}749\ MW$$

$$Tier\ 2\ Capacity = (19{,}339 - 12{,}185) = 7{,}154\ MW$$

$$Tier\ 2\ ELCC\ Accreditation = (3{,}845 - 2{,}749) = 1{,}096\ MW$$

Equation Example 1: Tier 1 and Tier 2 Calculation

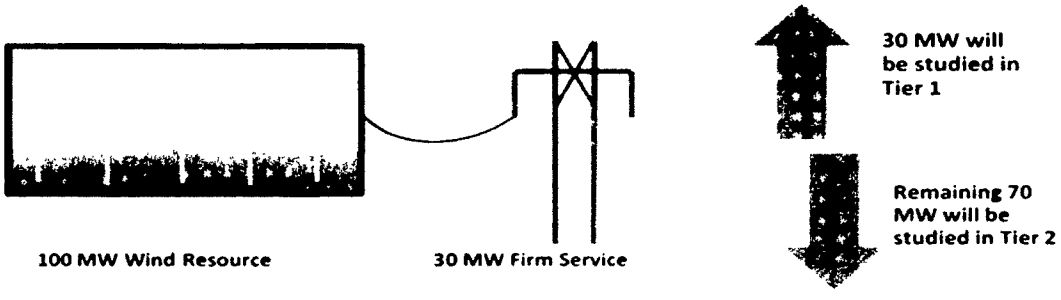

Figure 5: Tier 1 vs Tier 2 Study Priority

b. ELCC Allocation Load Shape

Once each tier level has had its total ELCC assigned, the ELCC megawatt value will be allocated to each individual wind or solar resource. The allocation to Tier 1 resources will be based on the LRE load shapes,

which will accredit these resources based on historical performance[6]for serving the load for which they are contracted. For accurate allocation of Tier 1 resources, LREs will be required to annually submit their previous years hourly load data to SPP. If the LRE does not provide the data by June 1, their resource will be allocated with Tier 2 resources.

The assignment to Tier 2 resources will be based on the SPP BA load shape, which will give these resources an accreditation percentage based on historical performance at the time of the SPP peak.

c. ELCC Allocation Load Hours

The available accredited capacity from the ELCC study will be allocated by selecting the hourly net power output values occurring during the top 3% of load hours for the LRE (Tier 1 resources) or SPP BA load (Tier 2 resources) for the peak season that is being analyzed. The yearly values selected will be averaged together to determine the amount of historical production during the top 3% load hours. The data must include the most recent 3 years.

- For wind or solar facilities in commercial operation 3 years or less:
    a) New wind or solar facilities that do not have 3 years of data will be supplemented by output data from the nearest wind facility with a comparable capacity factor or technology vintage to complete the appropriate data set. If no nearby facility has a comparable capacity factor, the output data from the existing facility will be scaled up to mimic the power curve of a more modern facility.
- For wind or solar facilities that have been in commercial operation greater than 3 years:
    - a) The data must include all available data up to the most recent 10 years of commercial operation.
    b) Only metered hourly net power output (MWH) data may be used.

[6] SPP will look at the feasibility of adding curtailments back into the hourly historical performance data. Bring the data back to the SAWG for the 2020 ELCC scoping effort.

7. ELCC Schedule for Implementation

In order to allow LREs a level of certainty based on existing wind accreditation expectations in the next 3 year planning horizon, the ELCC methodology schedule for implementation is proposed starting with the 2023 summer season. Until ELCC becomes effective, wind resources will continue to calculate accreditation based on current SPP Planning Criteria in 7.1.6.1 (7). Starting with the 2023 summer season, all wind resources will be accredited using the ELCC methodology.

SPP staff will perform a summer and winter ELCC study in years 2020 and 2021, and allocate the results to each Load Responsible Entity (LRE) as proposed in this whitepaper for information only. Results for the 2023 Summer Resource Adequacy process will be posted by October 1, 2022. The study will include all resources that have either reached commercial operation by June 1, 2022 or have been submitted in the February 15, 2022 Resource Adequacy Workbook (RAW) as intended to be available for the 2023 summer peak.

8. New Facilities

It is recognized that wind and solar facilities may come into service after June 1 of any individual calendar year or may not be submitted by the appropriate LRE in time to be included in the annual ELCC study. Such occurrences should be rare given the construction lead times for generating facilities. For new wind or solar facilities that reach commercial operation after June 1 of the applicable study year, the facilities must be submitted in the Workbook by Feb 15 to be studied in the upcoming ELCC study. If not, the facility would receive a flat 10% accreditation for wind and a flat 50% accreditation for solar for the upcoming summer peak season.

For example, if a new facility has a commercial operation date of November 1, 2022 and was reported in the Workbook submission by May 15, 2022 that facility will be studied in the 2022 ELCC study, which will be used for the 2023 summer season. In this example, the entity must demonstrate the facility is a Designated Resource before June 1, 2022 in order to be considered a Tier 1 resource for the 2022 study. If a new generator has a commercial operation date of November 1, 2022, but was not analyzed in the 2022 ELCC study then for the 2023 summer season that facility would receive a flat accreditation.

9. Annual ELCC Accreditation Review

Leading up to and upon implementation, the SAWG shall continue to monitor the ELCC accreditation for wind and solar. Modifications to the methodology may be deemed appropriate and could include changes to the tier definitions, allocation method to each facility and consideration of need for a sub-regional derivation of an ELCC value (wind and solar) in place of a region-wide single value.
Appendix Appendix A:

2019 ELCC Wind Study

Appendix B:

Link to 2019 ELCC Solar Study once approved and posted on SPP website

Appendix C:

For the ELCC Wind Study, the scaling approach that SPP staff chose was to scale up or down the current wind installations installed in the SPP footprint. This method was used instead of trying to predict where future wind installations would be located, which could inaccurately bias the results for any future installed capacity. For example, if the selection of future wind was predominantly located in higher wind capacity areas, it could alter the results compared to the wind resource locations actually in commercial operation.

This could appear as a conservative modeling assumption that future wind plants would have output patterns identical to those of existing wind plants. In reality, future wind plants could inherently have output patterns that are different from those of existing wind plants, which may increase or decrease the ELCC of those resources above the level modeled by SPP. This is because new wind plants built even a short distance away from existing wind plants will have somewhat different output patterns due to the inherent geographic diversity of wind resources. In addition, technological advances such as taller turbine towers and longer blades are increasing the output of new and repowered wind plants. Historically, this tends to significantly increase the capacity value of these plants because the increase in output primarily occurs during periods when older wind plants had lower output. These factors could potentially help offset the decline in wind's ELCC percentage at higher wind penetrations. The impacts of new wind farms will be captured in the annual ELCC wind analysis and the results will reflect the impacts of the new technology based on the historical performance, which could increase or decrease ELCC accreditation.

Appendix D:

Solar and Wind Studied Together

The effects of wind and solar studied together versus separately were analyzed as well using the results from the ELCC Wind Study Report[7]. The results in Table 1 represent the ELCC values for 19,339 MW of nameplate wind and 4,282 MW of nameplate solar studied together versus studied separately shows a

[7] 2019 ELCC Wind Study Report: https://www.spp.org/Documents/60434/2019%20ELCC%20Wind%20Study%20Report.pdf

difference of 130 MW of accreditation between the two averages accounting for less than 0.5% of nameplate capacity. If wind and solar are analyzed separately, the effects of each resource type can be analyzed and an associated ELCC can be established for each fuel type, which does not over-value once resource over the other based on the allocation of capacity.

Table 1: ELCC results of wind and solar studied together vs separately.

Year	Wind & Solar Studied Together (MW)	Wind & Solar %	Solar Only (MW)	Wind Only (MW)	Wind Only + Solar Only (MW)	Total %
2012	4,464	18.9%	2,313	2,043	4,356	18.4%
2013	4,495	19.0%	2,365	2,022	4,387	18.6%
2014	6,100	25.8%	2,731	3,126	5,857	24.8%
2015	7,099	30.1%	2,937	3,952	6,888	29.2%
2016	9,114	38.6%	2,733	6,198	8,931	37.8%
2017	8,823	37.4%	2,960	5,932	8,892	37.6%
Average	**6,682**	**28.3%**	**2,673**	**3,879**	**6,552**	**27.7%**

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-2:

Will the proposed wind facilities be registered as dispatchable?

Response No. TIEC 4-2:

Yes.

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Prepared By: Edward J. Locigno	Title: Regulatory Analysis & Case Mgr
Sponsored By: Jay F. Godfrey	Title: VP Energy Mktng & Renewables

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PUC DOCKET NO. 49737

SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-3:

In reference to the file Explanation of Code.pdf provided in the workpapers of Akarsh Sheilendranath:

a. Please identify each of the load serving entities included in determining the SPP Central LMPs in the Aurora model runs:
   i. AEPWALL.
   ii. GRDA.
   iii. OKGEALL.
   iv. SWPSALL.
   v. WFECALL.

b. Please provide the settlement location(s) / Pnode(s) designation listed on the SPP day ahead market LMP reports for each zone listed in part (a).

c. Is the settlement location "AEPM-CSWS" included in the SPP day ahead market report the AEP load zone? If not, please specify the AEP load zone location listed in the SPP market report.

d. Please provide the hourly day ahead LMPs for each zone listed in part (a) from January 1, 2016 through the latest available.

e. Do the SPP day ahead market LMP reports include a settlement location for SPP Central? If yes, provide its location name and the hourly day ahead LMPs from January 1, 2016 through the latest available.

f. Please explain the difference between SPP South Hub and SPP Central. What transmission zones are included in the SPP South Hub LMPs?

Response No. TIEC 4-3:

a. As explained in witness Sheilendranath's testimony (p. 11), the five zones referenced in the "Explanation of Code.pdf", and herein, are each PROMOD-defined SPP generation areas. The generation resources of these five PROMOD-defined areas map closely to the generation resources in the AURORA-defined "SPP Central" zone for which AEP's market fundamentals forecasts have been prepared. To calculate the prices for PROMOD-equivalent for "SPP Central", Mr. Sheilendranath calculated the hourly generation-weighted-average LMP, based on PROMOD simulations, for these five generation areas. These generation areas include the generation resources of the SPP

member entities listed below. Note that, while these member entities are load serving entities, the PROMOD-equivalent for "SPP Central" reflects the prices based on generation resources of these areas, and not the loads.

AEPWALL
- American Electric Power System West
- Arkansas Electric Coop Corp. (AEPW portion)
- East Texas Electric Cooperative
- Golden Spread Electric Coop. (AEPW portion)
- Oklahoma Municipal Power Authority (AEPW portion)

OKGEALL
- Oklahoma Gas & Electric Company
- Arkansas Electric Coop Corp. (OKGE portion)
- Oklahoma Municipal Power Authority (OKGE Portion)
- Peoples Electric (OKGE Portion)

SWPSALL
- Southwestern Public Service Company
- Golden Spread Electric Coop
- Lubbock Power and Light
- Municipalities in SPS
- WFEC Coops in SPS

WFECALL
- Oklahoma Municipal Power Authority (WFEC Portion)
- Peoples Electric (WFEC Portion)
- Western Farmers Electric Cooperative

GRDA
- Grand River Dam Authority

b. As explained in part a., these PROMOD zones (as proxy for the AURORA "SPP Central" zone) are generation zones defined by SPP in its PROMOD model. These generation zones are not defined in SPP's markets, therefore no SPP settlement location/Pnodes for these PROMOD generation zones exist.

c. Yes.

d. Please see response to part b.

e. No.

f. SPP South Hub is a Trading Hub in SPP's Integrated Marketplace. The SPP South Hub includes a cluster of generation and load Pnodes that are selected based on hub to load zone Price Separation and Price Volatility parameters. These assessments are performed by SPP to define a high liquidity hub to facilitate trading in the day-ahead and real-time energy markets. The specific Pnodes included in SPP's South Hub are provided in SPP South Hub Definition file, which can be accessed via SPP's Marketplace webpage using the weblink below. Current definition includes select Pnodes in AEPW, OKGE and WFEC transmission zones.

https://marketplace.spp.org/pages/modeling-reports

SPP Central is an AURORA-model defined transmission zone. Note that the AURORA model is a zonal model, therefore it has no pricing nodes within any of its transmission zones. AURORA's SPP Central zone includes generation and loads of SPP market participants and member entities within SPP's CSWS (AEPW), WFEC, OKGE, GRDA, and SWPS areas.

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Prepared By: James F. Martin — Title: Regulatory Case Mgr
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Prepared by: Sophie Leamon — Title: Research Analyst, the Brattle Group

Sponsored by: Akarsh Sheilendranath — Title: Senior Associate, The Brattle Group

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-4:

Please provide the hourly day ahead LMPs from January 1, 2016 through the latest available for each wind generator node within 25 miles of any of the 3 proposed wind projects.

Response No. TIEC 4-4:

The Company does not have the specific information requested. However, based on the expected interconnection locations of the Selected Wind Facilities, the Company believes the wind farms listed below are closest to the 3 proposed wind projects. For Traverse, the closest existing wind facilities are Minco, Canadian Hills and Red Dirt. For Sundance and Maverick, the closest existing wind facilities are Chisolm View, Birkenridge and Red Dirt. For these existing wind facilities, the requested hourly day-ahead LMPs are provided from January 1, 2016 through the latest available. See TIEC_4_004_Highly Sensitive Attachment_1 for the following representative PNode locations for the five closest existing wind facilities:

- Minco (OKGE_MINCO)
- Canadian Hills (CANADIAN_HILLS_1)
- Red Dirt (OKGE.GRDA.REDDIRT)
- Chisolm (OKGE_CHISHOLM)
- Birkenridge (GRDA_BRECK)
-

Attachment 1 responsive to this request is HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15th Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Anita A. Sharma — Title: Engineer Staff
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Prepared by: Sophie Leamon — Title: Research Analyst, the Brattle Group

Sponsored by: Akarsh Sheilendranath — Title: Senior Associate, The Brattle Group

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-5:

Please provide NPV cost and benefit analysis for the proposed Maverick wind facility under the Base Fundamentals with and without CO2 cases in the same format SWEPCO's response to TIEC 2-7 and supporting workpapers in "live" EXCEL format.

Response No. TIEC 4-5:

SWEPCO acquiring all or a portion of only the Maverick facility is not a potential outcome based on the terms of the Purchase and Sale Agreements with the sellers, and therefore the requested analysis has not been prepared.

Prepared By: Paul N. Demmy	Title: Resource Planning Anlyst Sr
Prepared By: Jon R. Maclean	Title: Resource Planning Mgr
Prepared By: William S. Robinson	Title: Resource Planning Anlyst Staff
Prepared By: James F. Martin	Title: Regulatory Case Mgr
Sponsored By: John F. Torpey	Title: Mng Dir Res Plnning&Op Anlysis

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PUC DOCKET NO. 49737

SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-6:

Please provide NPV cost and benefit analysis for the proposed Sundance wind facility under the Base Fundamentals with and without CO2 cases in the same format SWEPCO's response to TIEC 2-7 and supporting workpapers in "live" EXCEL format.

Response No. TIEC 4-6:

SWEPCO acquiring all or a portion of only the Sundance facility is not a potential outcome based on the terms of the Purchase and Sale Agreements with the sellers, and therefore the requested analysis has not been prepared.

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' FOURTH REQUEST FOR INFORMATION

Question No. TIEC 4-7:

If SWEPCO has not developed separate cost-benefit analyses for the Maverick and Sundance facilities, please provide the information necessary to calculate the costs and benefits.

Response No. TIEC 4-7:

SWEPCO acquiring all or a portion of only the Sundance or Maverick facilities by themselves is not a potential outcome based on the terms of the Purchase and Sale Agreements with the sellers, and therefore the information necessary to calculate the costs and benefits has not been prepared.

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