April 13, 2019

Via FedEx
Ms. Terri Bordelon
Louisiana Public Service Commission
Records Division
602 N. Fifth St.
Galvez Bldg, 12th Floor
Baton Rouge, LA 70802

Re: LPSC DOCKET NO. I-34715, IN RE: INTEGRATED RESOURCE PLANNING ("IRP") PROCESS FOR SOUTHWESTERN ELECTRIC POWER COMPANY (SWEPCO), PURSUANT TO GENERAL ORDER DATED APRIL 20, 2012

Dear Ms. Bordelon:

Enclosed please find the one (1) original and three (2) copies of Sierra Club's **PUBLIC** Comments on Southwestern Electric Power Company's Draft Integrated Resource Plan in the above-captioned docket. Please file the original in the record and return one (1) date-stamped copy to me in the self-addressed stamped envelope enclosed. If you have any questions or require any additional information, please to not hesitate to contact me.

Respectfully submitted,

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BEFORE THE

LOUISIANA PUBLIC SERVICE COMMISSION

SOUTHWESTERN ELECTRIC POWER COMPANY (SWEPCO), INTEGRATED RESOURCE PLANNING PROCESS PURSUANT TO THE GENERAL ORDER R-30021 (CORRECTED) ISSUED APRIL 20, 2012

Docket No. I-34715

SIERRA CLUB'S COMMENTS

ON SOUTHWESTERN ELECTRIC POWER COMPANY'S

DRAFT INTEGRATED RESOURCE PLAN

(PUBLIC VERSION)

April 15, 2015

Developed with the Assistance of the Applied Economics Clinic

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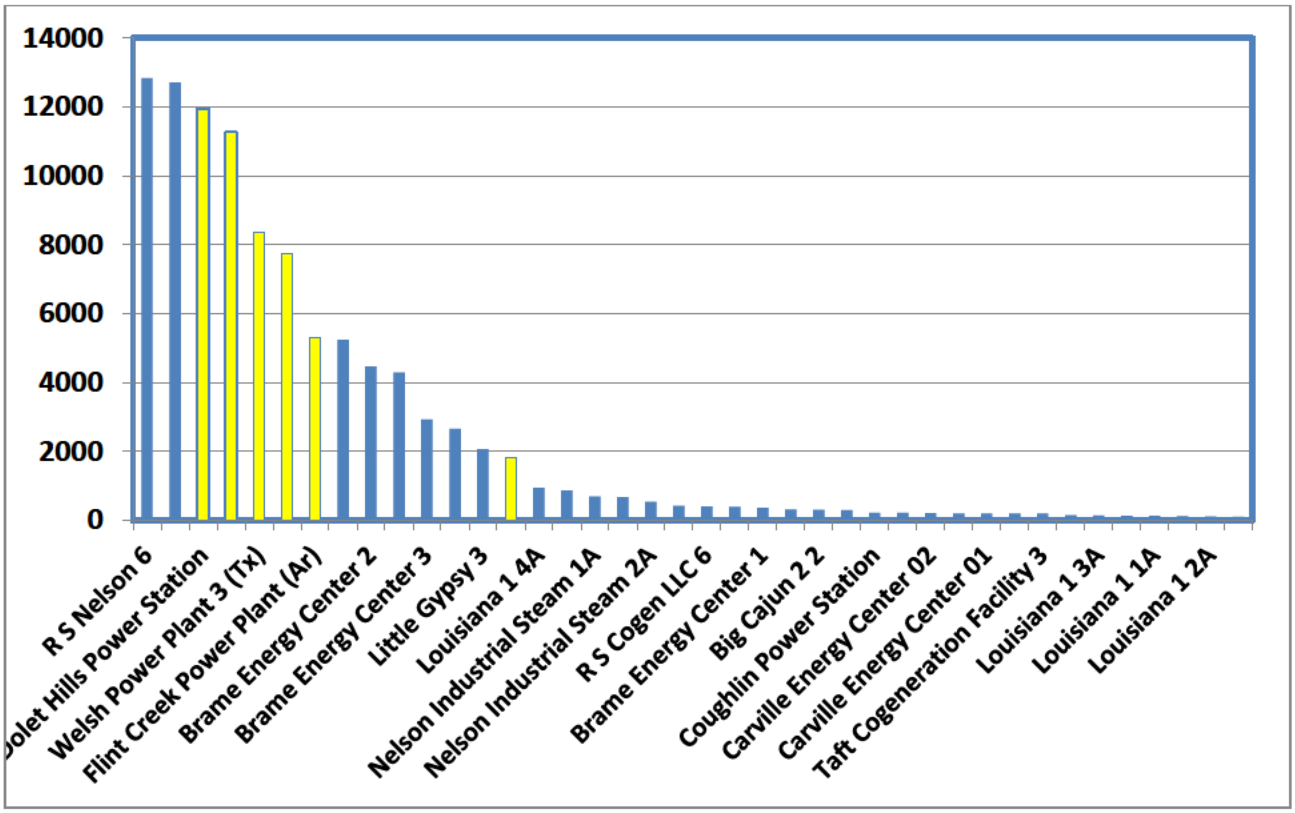
INTRODUCTION

Like most investor owned utilities in the country, SWEPCO stands at a crossroads. One path is business as usual, in which SWEPCO continues to operate the largest-polluting fleet among regulated Louisiana utilities, even though the Company has excess generation capacity through at least 2025,[1] some of which is uneconomic and uncompetitive in the energy market. As reflected in the figures below, SWEPCO's fossil fuel resources emit more sulfur dioxide, nitrogen oxide, and carbon dioxide than virtually every other source in the state.

Figure 1: Combined Annual Sulfur Dioxide and Nitrogen Oxide Emissions 2017 from Top 40 Louisiana-Regulated Units[2]



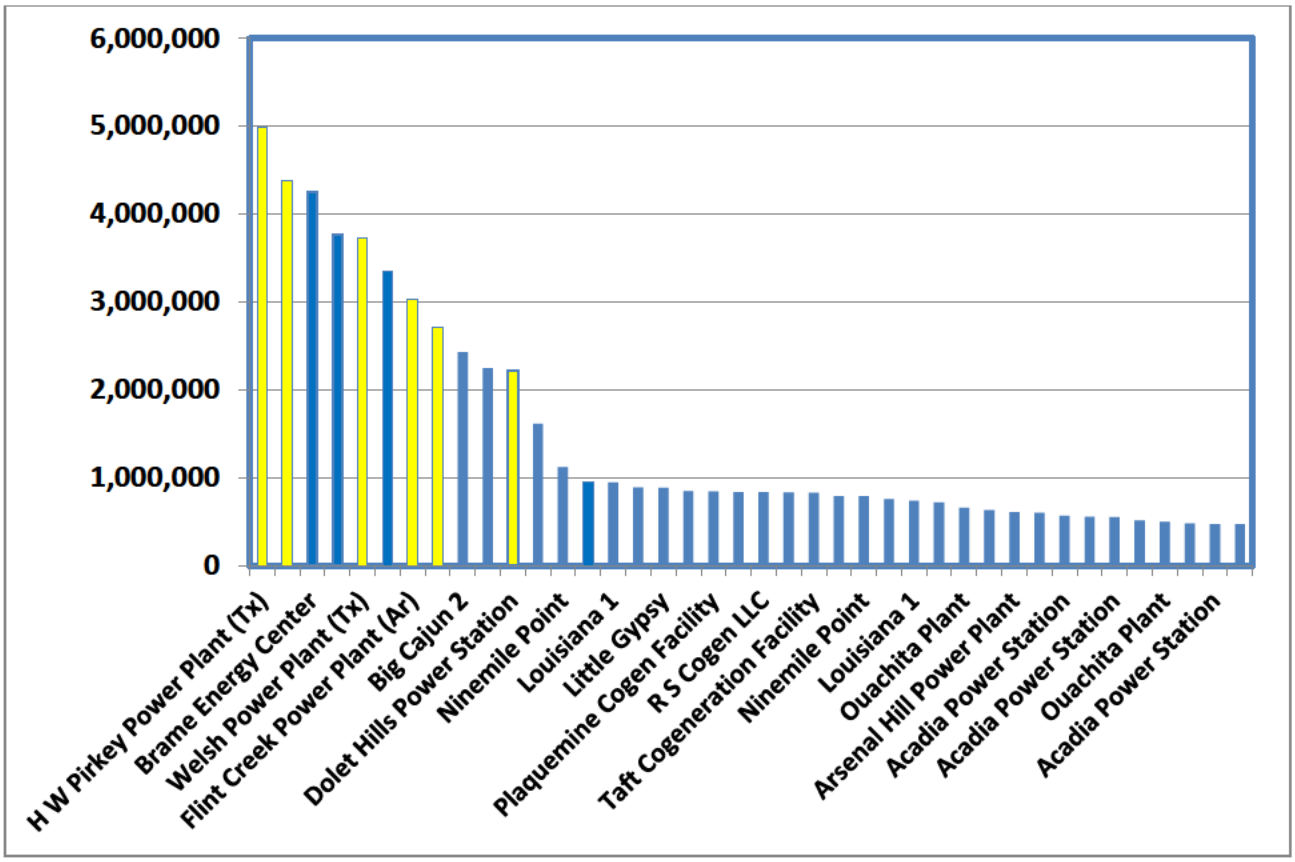
And as discussed in greater detail below, the SWEPCO's Dolet Hills and Pirkey lignite-burning units regularly operate at a loss—*i.e.*, their total production cost exceed energy revenues in the Southwest Power Pool ("SPP") energy market. Indeed, Cleco Power, the co-owner and operator of Dolet Hills, has apparently recognized the diminishing returns at the unit, and committed to operating it only seasonally, when demand (and energy prices) warrant. According to Cleco, the reduced dispatch of the unit will save its ratepayers up to $40 million annually. Meanwhile, in its draft Integrated Resource Plan, SWEPCO refused to conduct any economic or retirement analysis for Dolet Hills, even though the Company was indisputably aware that the unit consistently operates at a loss, is at risk of imminent retirement, and that mothballing or deactivating the unit could result

[1] SWEPCO Draft Integrated Resource Plan at ES-4 and ES-6 [hereinafter "Draft IRP"].

[2] EPA Air Markets Database, https://ampd.epa.gov/ampd/.

in significantly lower costs for ratepayers. In fact, SWEPCO's draft IRP inexplicably assumes that the already 30-year old plant will continue to operate throughout the planning horizon—for at least another 20 years.

Figure 2: Combined Annual CO_2 Emissions 2017 from Top 40 Louisiana-Regulated Units[3]



And the outlook for SWEPCO's solid-fuel fleet gets worse. Indeed, the Company faces several critical decision points relating to capital and environmental investments required to continue operating of each of its solid-fuel power plants. Moreover, the average age of retirement for coal- and lignite-burning power plants across the country is trending younger and younger—and significantly so.[4] A recent Brattle Group study confirms that coal- and lignite-fired power plants across the country are increasingly uneconomic, and that the continued operation of those plants could cost ratepayers billions.[5] Thus, in addition to being among the highest-polluting units in the

[3] EPA Air Markets Database, https://ampd.epa.gov/ampd/.

[4] Lawrence Berkeley National Laboratory, *Power Plant Retirements: Trends and Possible Drivers* at 8 (Energy Analysis and Environmental Impacts Division Nov. 2017), *available at* https://emp.lbl.gov/sites/default/files/lbnl_retirements_data_synthesis_final.pdf.

[5] Metin Celebi, et al., *The Cost of Preventing Baseload Retirements: A Preliminary Examination of the DOE Memorandum* (Brattle Group July 2018), http://www.brattle.com/news-and-knowledge/news/report-by-brattle-economists-assesses-potential-costs-associated-with-administration-policy-designed-to-prevent-the-retirement-of-all-coal-and-nuclear-plants.

region, the Company's lignite units are increasingly uncompetitive and face a long future of potentially significant capital expenses that will increase costs for Louisiana ratepayers.

To SWEPCO's credit, the Company tacitly recognizes that there is another path—one that involves investing in clean, sustainable, and cost-effective renewable energy and energy efficiency resources to replace aging fossil-fuel resources. Indeed, to the extent the Company needs additional generation capacity, SWEPCO's IRP modeling demonstrates that wind and solar power additions are far and away the least-cost options for Louisiana ratepayers.[6] SWEPCO also recognizes that energy storage options are increasingly attractive, and supply-side efficiency measures like upgrading the utility's transmission system can play a significant role in reducing electric system costs. We support those aspects of SWEPCO's initial assumptions, and commend the Company's efforts to adopt a more sustainable mix of lower-cost and reliable renewable, coupled with battery storage and innovative energy efficiency programs and demand response.

At the same time, however, we have serious concerns about SWEPCO's planning assumptions. As noted, despite the widely-acknowledged unfavorable fundamentals for nation's aging coal- and lignite-burning fleet and the increasing speed at which those plants are retiring, SWEPCO's base case does not assume *any* coal retirements over twenty-year planning horizon.[7] This is an unrealistic and risky assumption for SWEPCO's ratepayers.

Utilities across the country, including Cleco Power and Entergy Louisiana, are abandoning reliance on similarly uneconomic fossil fuel generation resources and adopting a mix of lower-cost, sustainable, and reliable generation resources. We urge SWEPCO to do the same.

To that end, the Company's final IRP must include a transparent and robust analysis the replacement of its uneconomic fossil fuel resources—Dolet Hills and Pirkey, at a minimum—with affordable renewable energy and energy efficiency investments, which will produce safe and sustainable jobs, while also reducing electric system costs for both utilities and ratepayers and reducing emissions from fossil fuel energy sources. Specifically, and as explained below, we urge SWEPCO to run scenarios specifically evaluating the retirement of those two units. Additionally, we urge SWEPCO to revise and update its IRP assumptions to reflect more recent renewable energy assumptions and cost-effective storage and efficiency measures.

COMMENTS

I. SWEPCO's IRP Analysis Is Biased In Favor Of Keeping Its Coal Assets.

The Commission's IRP Rules provide that the "process shall account for significant constraints such as planning, regulatory, operational, reliability and environmental requirements, and shall take into account the sensitivity of the resource plan to variations in assumptions such as load forecasts, fuel costs, market prices, construction costs, environmental regulations, and

[6] Draft IRP at ES-5.

[7] *See id.* at ES-3 (reflecting total coal capacity remaining constant throughout planning period).

other relevant assumptions.[8] The Rules make clear that regulated utilities must conduct sensitivity and scenario analyses of major assumptions that might affect the results of the reference resource plan, and must include an analysis of a reasonable range of alternative plans.[9]

SWEPCO's IRP analysis fails to comply with the text and purpose of the IRP Rules by failing to appropriately capture the economic risks facing its coal units. Instead, the IRP analysis is biased towards keeping coal generation in operation in several ways:

- **The Company fails to generate a least-cost plan by not economically evaluating its existing resources.** There is no modeling of unit retirement—other than retiring one unit in one particular year (Pirkey in 2028). Without a robust retirement analysis that evaluates existing resources against new resources, a potentially lower-cost plan is left on the table in this IRP.

- **The natural gas and coal price assumptions in the IRP are both favorable to coal generation.** The Company's forecasts for natural gas prices are too high—relative to actual prices, futures, and more recent forecasts—and its coal prices are too low. In both cases, coal generation will appear unreasonably attractive in the Company's modeling. The Company also should test low and high bounds for coal and natural gas prices separately, not together, because these prices are not correlated.

- **The Company is self-committing its coal units, instead of dispatching them economically.** SWEPCO ratepayers are effectively subsidizing SPP customers if the Company fails to bid the units into the SPP market on a cost-basis.

- **It is unclear if future environmental compliance costs were included in modeling.** Much detail is provided in the IRP on the state of environmental regulations but the assumed costs being imposed on SWEPCO's resources are not provided.

A. The Company fails to generate a least-cost plan by not economically evaluating its existing resources.

The Commission Rules specifically provide that "[s]ensitivity analyses shall be performed to determine the risk that the reference resource plan might be exposed to unacceptable cost increases under certain conditions, and to evaluate alternative resource plans that would be more economic given the alternative assumptions."[10] Specifically, the "IRP shall also include analyses of the impacts on the reference resource plan, by developing other alternative resource plans under consistent alternative futures involving changes of multiple input assumptions."[11]

SWEPCO's Draft IRP focuses on new resource selection while failing to evaluate futures for existing resources. The Company's energy mix is expected to be 83 percent coal in 2019, making costs and risks to coal generation crucial for future planning. But the modeling in this IRP fails to let

[8] Louisiana Public Service Commission, Integrated Resource Planning Rules for Electric Utilities in Louisiana, Attachment A to Corrected General Order, LPSC Docket No. R-30021 ¶(3) (Apr. 2, 2012) [hereinafter "LPSC IRP Rules"].

[9] *Id.* ¶ (6)(g).

[10] *Id.* ¶ (6)(g)(i).

[11] Id. ¶ (6)(g)(ii).

existing coal units compete with new (potentially lower-cost units). Therefore, the IRP does not necessarily provide a "least-cost" result.

The Company stated that its IRP "does not include analyses that support any decision to deactivate a generating unit."[12] But the Company did not find retirement to be economic because it failed to ask that specific question. The IRP appears to keep the retirement dates for existing units fixed. The Company claims that "unit retirement decisions will be made based on unit condition, ongoing unit investment requirements, and relevant market factors."[13] These are indeed reasonable factors to consider but they have not been evaluated in this IRP.

The only exception was that SWEPCO, in response to stakeholders, conducted a limited retirement analysis for one unit (Pirkey) in one particular year: 2028. Early retirement of Pirkey in 2028 was found to be $90M more expensive than keeping the unit on-line. However, SWEPCO did not provide details of how it arrived at the $90 million figure; it is therefore not possible to evaluate the accuracy of SWEPCO's claim that early retirement of Pirkey is more expensive. Also, as we discuss further, several key assumptions in the IRP modeling were biased towards coal generation—raising doubts regarding SWEPCO's limited retirement analysis of Pirkey.

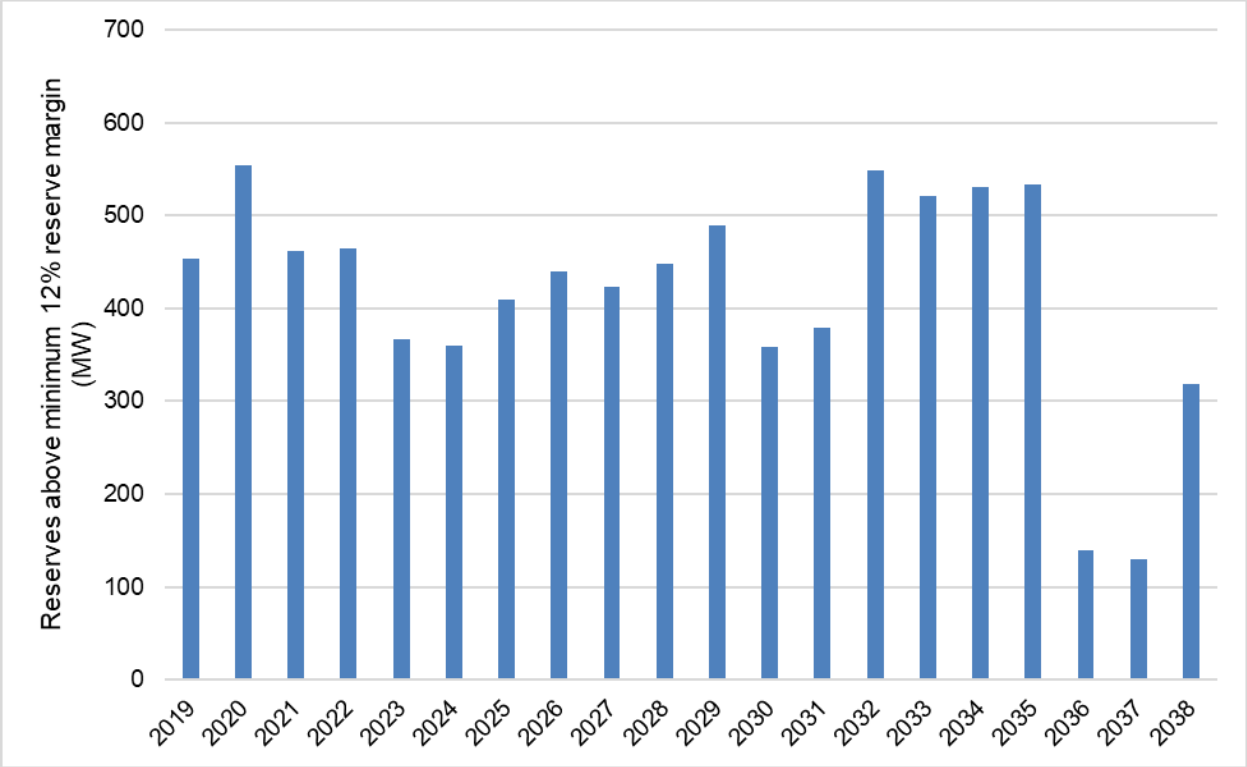
SWEPCO did not conduct an optimized retirement analysis of other existing capacity resources, nor did it present any sensitivity analysis of the Pirkey 2028 retirement option. Had SWEPCO optimized its Pirkey retirement analysis or conducted an optimized retirement analysis of its existing capacity fleet, SWEPCO may have found cost savings associated with early retirement of Pirkey or other plants. As SWEPCO's IRP currently stands, the existence and size of these potential savings are unknown.

SWEPCO's failure to conduct an optimized retirement analysis is particularly concerning because it exposes ratepayers to future risks and costs of coal generation—as we discuss further. Under its preferred plan, SWEPCO would have enough capacity to facilitate cost-effective unit retirements (see Figure). Indeed, there is question of whether the Company could procure even more new capacity, than under its preferred plan, if the selected new resources were lower-cost. The Company fails to ask this question.

[12] Draft IRP at 30.

[13] Draft IRP at 29-30.

Figure 3: Expected Surplus Capacity in SWEPCO's Preferred Plan[14]



B. The natural gas and coal price assumptions in the IRP are both favorable to coal generation.

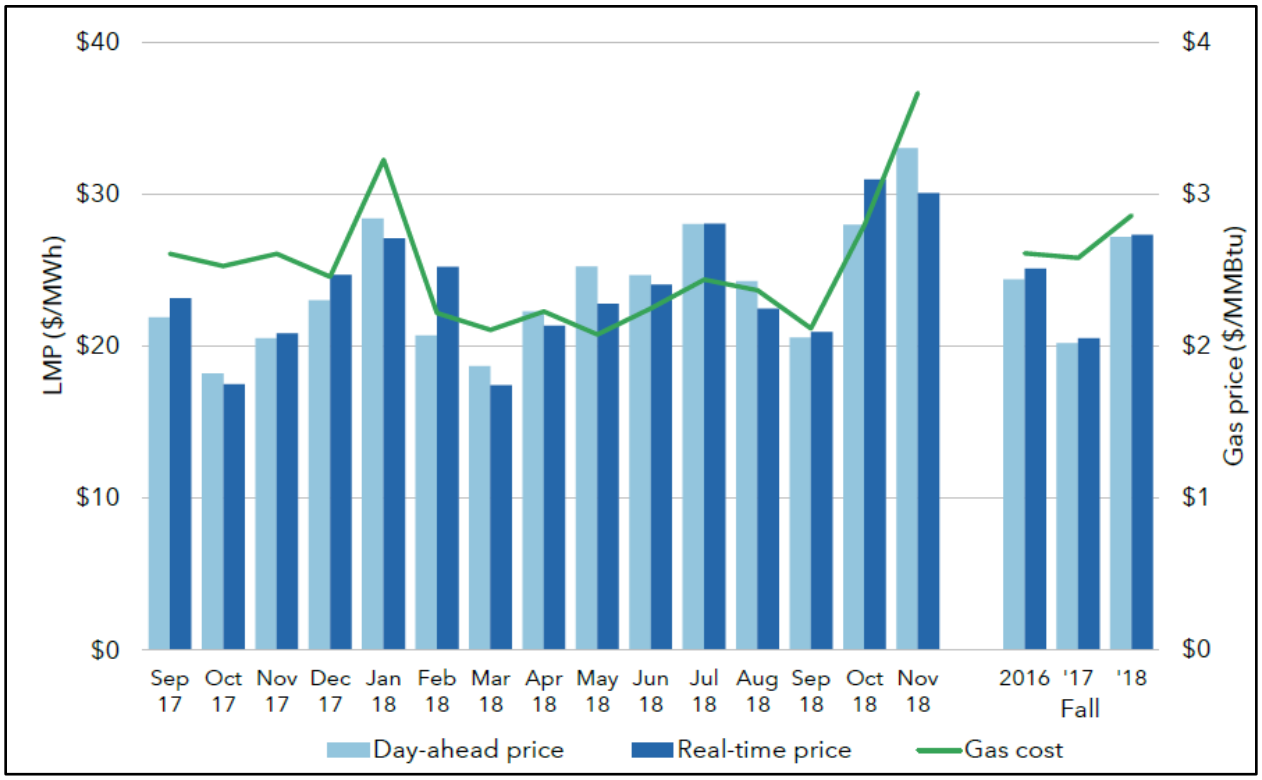
Under the Commission's IRP Rules, utilities "shall take into account the sensitivity of the resource plan to variations in assumptions," including "fuel costs."[15] Here, the fuel price forecasts in SWEPCO's IRP are biased towards coal generation in several key ways, making coal appear more competitive both today and in the future.

First, Natural gas prices are a critical input assumption for evaluating other resources because natural gas generators often set the price of electricity. This is evident in the Southwest Power Pool (SPP) wholesale energy market, where SWEPCO offers its generation and receives revenue based on the SPP market price (see Figure , which shows both monthly prices and those for the fall of the past three years).

[14] Draft IRP at 164

[15] LPSC IRP Rules ¶(3).

Figure 4: SPP Historical Natural Gas ($/MMBtu) and Electricity Prices ($/MWh)[16]

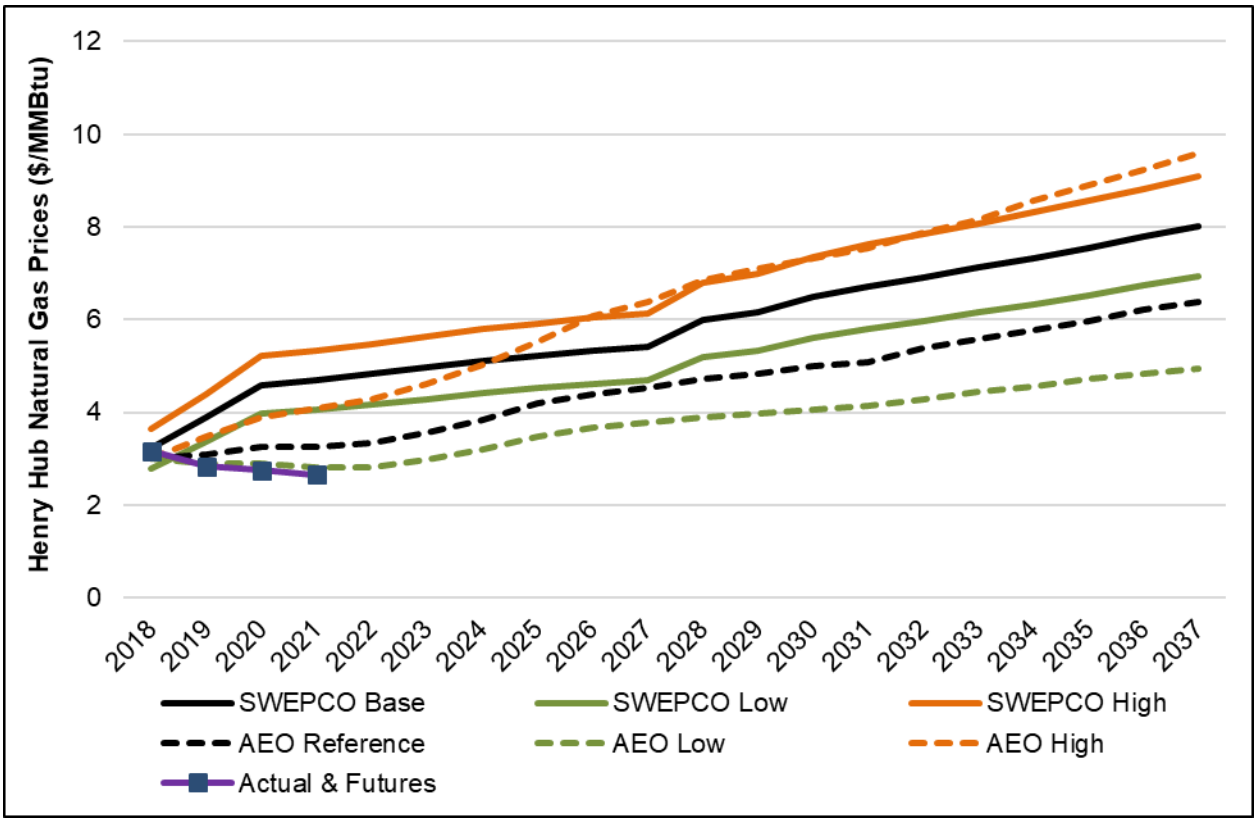


A higher gas price leads to a higher electricity price and, as a result, higher revenue for each unit of energy generation by SWEPCO's units. Therefore, the future gas price is an important determinant of the forward-looking economics of the coal fleet. However, SWEPCO's low, base and high natural gas price forecasts skew high compared to current projections from the U.S. Energy Information Administration's 2019 Annual Energy Outlook (AEO)—as shown in Figure .[17] Even SWEPCO's low gas price sensitivity is higher than the AEO 2019 base case. This indicates that SWEPCO's low gas sensitivity is too high, even if they were the base case. Indeed, the AEO low gas price case is in-line with gas futures market prices which are also shown below. SWEPCO's high gas sensitivity far surpasses the AEO high bound through 2025. In sum, the Company's forecasts all skew high, which would lead modeling results to unfairly favor coal generation.

[16] SPP Market Monitoring Unit, *Fall 2018 Quarterly Report at slide 11, available at* https://www.spp.org/documents/59424/fall_2018_quarterly_presentation.pdf.

[17] The Company also presented a base case without a carbon price, however, this carbon price does not occur until 2028. Therefore, the no carbon gas price is comparable to the Company's base case until then.

Figure 5: SWEPCO IRP and EIA AEO Henry Hub Natural Gas Prices ($/MMBtu)[18]



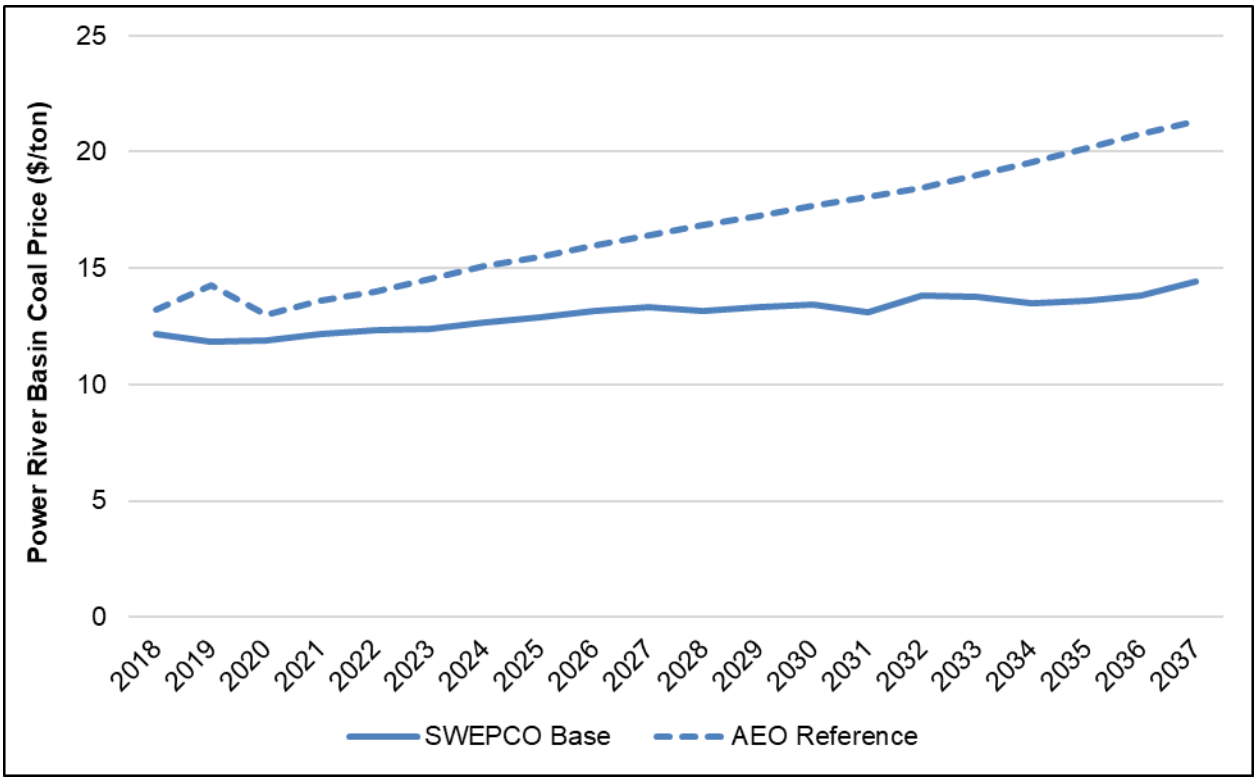
Second, SWEPCO's reference Powder River Basin (PRB) prices are much lower than the corresponding prices reported by the AEO 2019—shown in Figure .[19] As with high gas prices, low coal prices make coal generation appear more competitive against other resources. While we have not been provided access to modeling results in SWEPCO's IRP, review of the key assumptions shows that they are skewed in favor of coal generation.

SWEPCO's IRP models its "low" gas and coal prices together ("low band") and "high" gas and coal prices together ("high band"). Failing to model coal and natural gas price sensitivities separately dampens the extent of fuel price risk in modeling. The impacts of low coal and gas prices on coal generation counteract each other. For instance, this framework does not allow for an evaluation of the present landscape where coal prices are closer to SWEPCO's base coal price and near-term natural gas prices are expected to be below SWEPCO's low gas prices.

[18] *See* Draft IRP at 152; U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2019. Table: Natural Gas Supply, Disposition, Prices, available at* https://www.eia.gov/outlooks/aeo/data/browser/; *see also* CME Group, *Gas Futures* (visited Apr. 1, 2019), https://www.cmegroup.com/trading/energy/natural-gas/natural-gas_quotes_settlements_futures.html.

[19] SWEPCO also presented high and low PRB coal prices

Figure 6: SWEPCO IRP and EIA Powder River Basin Coal Prices ($/ton)[20]



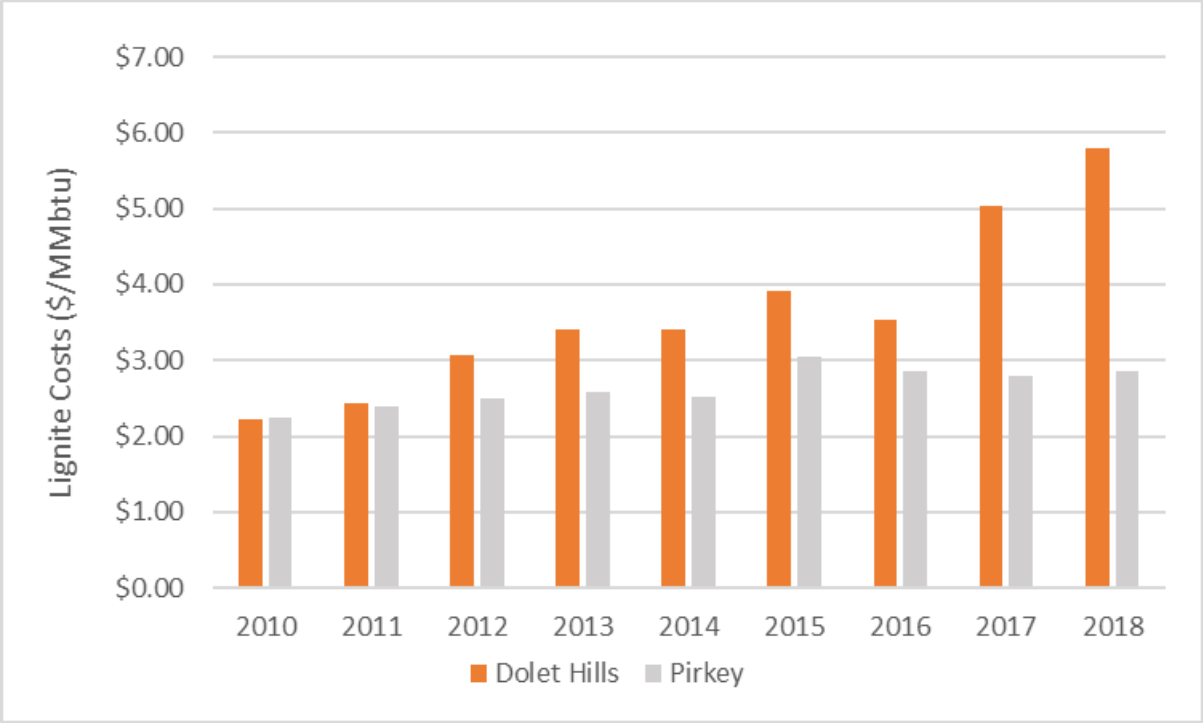
Third, although two of the SWEPCO's units, Dolet Hills and Pirkey, burn lignite, there is no cost *projection* for this fuel provided in the IRP. The economics of Dolet Hills and Pirkey are highly dependent on the costs of lignite which tends to be more expensive than other forms of coal. The costs of Dolet Hills lignite has increased substantially in recent years--as shown in Figure below. The cost of each unit of fuel has nearly tripled at Dolet Hills from 2010 to 2018.

Cleco, which co-owns Dolet Hills with SWEPCO, discusses problems at the Dolet Hills mine and increased lignite costs in its 2019 IRP. Regarding Dolet Hills, Cleco states that: "unforeseen issues at the new mine have resulted in a prolonged period of lower than expected deliveries, which translate into higher than expected inventory costs on a $/mmBtu basis."[21] According to Cleco, these issues include weather which "can severely impact the production levels at the nearby lignite mine, which can create supply shortages of lignite for the plant."

[20] *See* Draft IRP at 152; U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2019,Table: Coal Minemouth Prices by Region and Type, Powder River Basin,* https://www.eia.gov/outlooks/aeo/data/browser/.

[21] Cleco Draft 2019 IRP at 40.

Figure 7: SWEPCO IRP and EIA Powder River Basin Coal Prices ($/ton)[22]

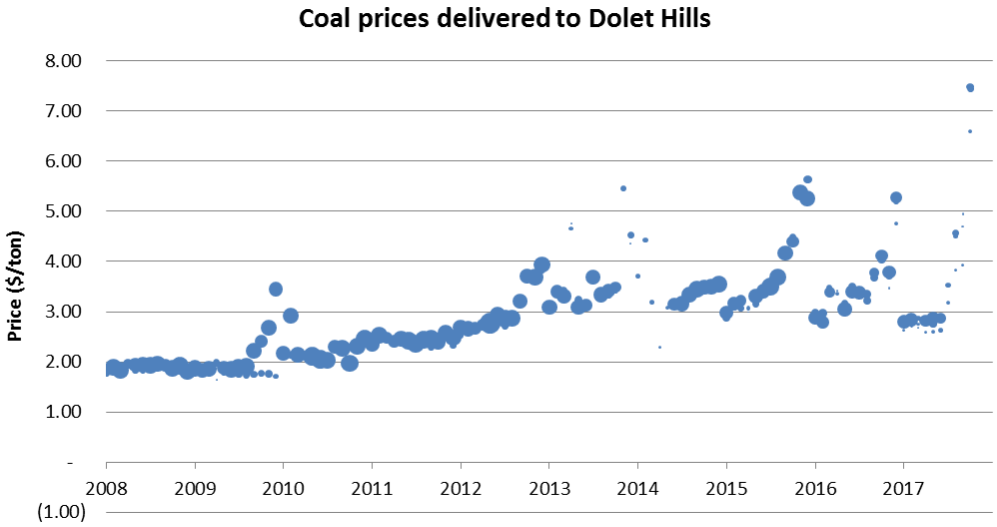


Although SWEPCO's supporting workpapers include a placeholder fuel cost for lignite at both Dolet Hills and Pirkey, the analysis does not appear to include any sensitivities or a range of costs for its lignite prices. As shown in Figure 8, according to publicly available data, SWEPCO's lignite costs are significantly higher and subject to greater volatility than the Company's projections for Powder River Basin coal.

Given recent lignite costs from the adjacent mine, the Company should include a reasonable price forecast. Moreover, it does not appear that the company plans on running any high coal cost scenarios.

[22] U.S. Energy Information Administration (EIA), Form 923, *available at* https://www.eia.gov/outlooks/aeo/data/browser/.

Figure 8: Recent Lignite Prices for Dolet Hills[23]



Finally, SWEPCO's gas, energy, and carbon prices are all perfectly correlated. When carbon regulations are incorporated into the modeling, gas and energy prices increase proportionately and in lockstep.[24] At the same time, coal prices do not appear to be similarly correlated. We urge SWEPCO to evaluate a sensitivity in which carbon regulation does not correlate perfectly with, and cause, a corresponding gas price spike.

C. The Company is self-committing its coal units, instead of dispatching them economically.

SWEPCO's units bid into the Southwest Power Pool ("SPP") wholesale energy market, which dispatches units based on the bids received—from the lowest-cost to the highest-cost unit.[25] SWEPCO, however, claims to "self-commit" its units into this market.[26] In other words, the Company decides when to operate the units, rather than dispatching economically, or in "merit order", with other units in SPP. In general, if plants are not dispatched economically, then the owners of those plants, and by extension ratepayers, are subsidizing the market at-large because they are providing energy at a discount. For instance, if the variable cost of a plant were $30/MWh but it

[23] *Id.* (EIA 923 data from 2008-2017)

[24] *See, e.g.*, SWEPCO Arkansas IRP Stakeholder Presentation at 33 (Aug. 14, 2018).

[25] Energy markets are reverse auctions where sellers bid in a price and the market selects the lowest cost resources needed to meet demands for electricity in a secure and reliable way. All resources called in a given hour are paid the clearing price as set by the bid of the marginal resource. Energy markets are designed to offer appropriate incentives known as "price signals" to encourage new resources to enter the market, thereby maintaining adequate supply for reliable electric service while simultaneously keeping costs down for consumers.

[26] *See generally* Rebuttal Testimony of A. Naim Hakimi, Application of Southwestern Electric Power Company for Authority to Change Rates, Pub. Utility Commission of Texas, Docket No. 46449 (May 19, 2017), *available at* http://interchange.puc.texas.gov/Search/Documents?controlNumber=46449&itemNumber=580.

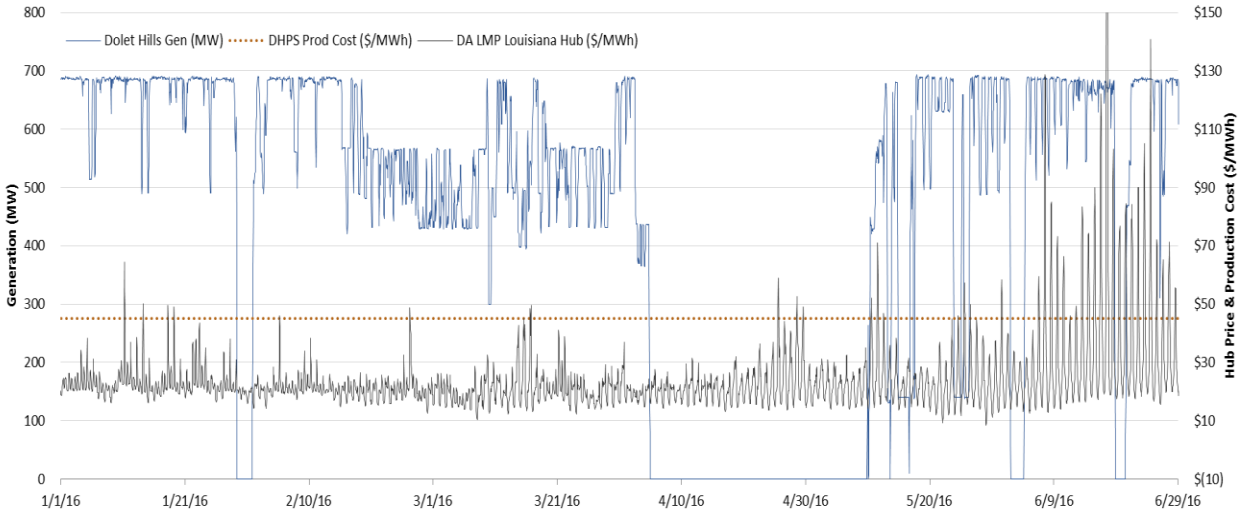
only made $20/MWh on the market, ratepayers are paying for the $10/MWh that is not collected from the market. In other words, ratepayers would save money if SWEPCO bought energy from SPP rather than running its uneconomic lignite units.

The Commission's Rules specifically require utilities to account for significant operational constraints, including changes to fuel and operational costs and market prices that might affect the resource plan.[27] Moreover, sensitivity analyses shall be performed to determine the risk that the reference resource plan might be exposed to unacceptable cost increases under certain conditions, and to evaluate alternative resource plans that would be more economic given the alternative assumptions.[28] Indeed, prudent resource planning and the LPSC IRP Rules themselves require SWEPCO to rigorously investigate the risk that its coal-fired power plants pose to its ratepayers. SWEPCO's analysis unreasonably fails to conduct any such analysis.

1. Dolet Hills Is Uneconomic and Poses Significant Risks to Ratepayers

As explained in Sierra Club's comments on SWEPCO's initial data assumptions, based on publicly reported data, Dolet Hills is routinely operating and dispatching energy into the market even though market prices are *below* the total production cost (*i.e.*, fuel, pollution control operating costs, and other variable operation and maintenance costs) to operate the plant. In other words, it is uneconomic to operate and regularly *losing* money in the energy market. It appears that those costs are then passed along to the Company's ratepayers through its fuel adjustment clause ("FAC"), under which the utility recovers its fuel costs incurred, less energy market revenues.[29]

Figure 9: Dolet Hills Dispatch: Out of Merit Order



The figure above is a snapshot of Dolet Hills' actual operations for the six-month period from January through June 2016. The blue line across the top represents the generation for the unit,

[27] LPSC IRP Rules ¶(3).

[28] *Id.* ¶ (6)(g)(i).

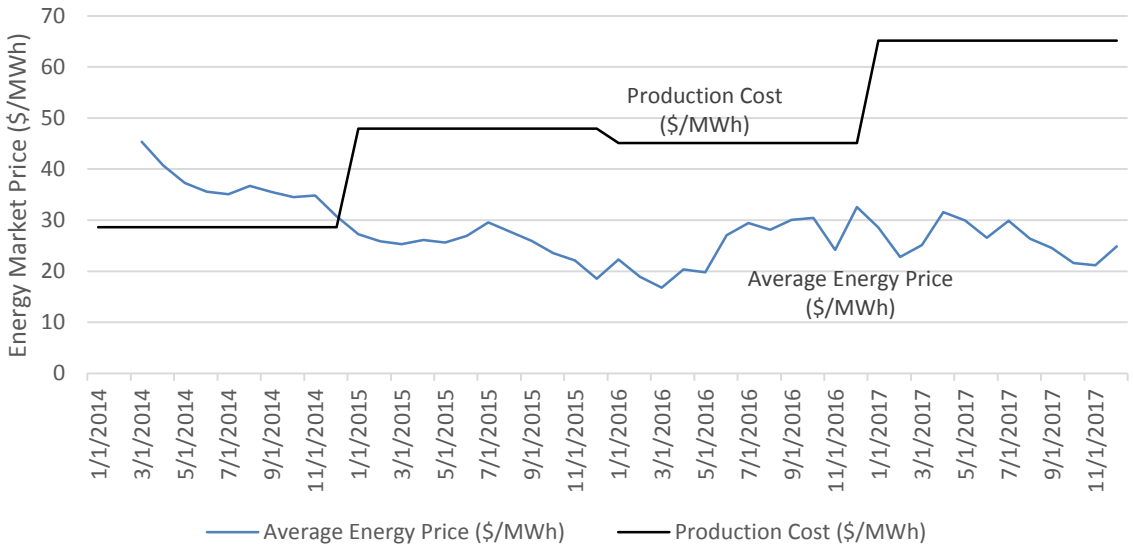
[29] *See* SWEPCO 2017 Form 10-K at 20, *available at* https://www.aep.com/investors/FinancialFilingsAndReports/Filings/docs/AEP_10K_2017.pdf.

indicating that it operated frequently at or near its capacity. The dotted yellow line represents the unit's total production cost (i.e., fuel costs and consumables) for that period of time. The black line represents the locational marginal price at the Louisiana hub, indicating that the unit was frequently operating even though the costs of operating the unit regularly exceeded the price that Dolet Hills received for energy generated.

SWEPCO's non-economic operation of Dolet Hills can be further demonstrated through a comparison of publicly-available production costs for the unit and the approximate revenues that the power plant receives for producing energy. According to data that SWEPCO and Cleco Power report to EIA, Dolet Hills acquires coal from the Dolet Hills mine at around 3.5c/MMBtu,[30] putting its fuel costs as the 95th percentile most expensive in the country (2015-2017). In recent years, some of the coal delivered to Dolet Hills has cost over 5.0c/MMBtu, making it nearly the most expensive coal plant in the country.

Despite the fact that the cost of operating Dolet Hills is significantly higher than the average power plant, Dolet Hills consistently dispatched at a high capacity factor, operating well above market prices. Examining locational marginal prices at SPP's Louisiana hub (data from SPP) against the estimated production cost of Dolet Hills[31] and the actual operations of those units as reported to EPA's Air Markets Program Dataset ("AMPD"), we estimate that Dolet Hills has incurred substantial losses almost every month its operated from 2014 through 2017.

Figure 10: Dolet Hills: Production Costs Versus Locational Marginal Price in SPP (publicly available data)

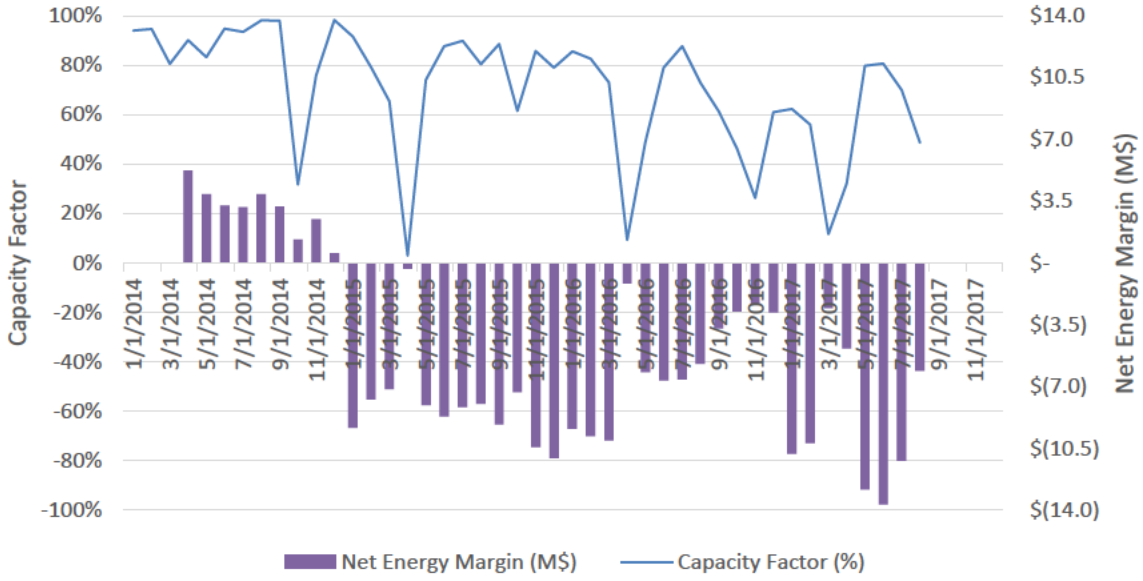


[30] U.S. Energy Information Administration (EIA), Form 923, *available at* https://www.eia.gov/outlooks/aeo/data/browser/ (data from years 2013-2017).

[31] Data derived from S&P Global Market Intelligence, which collects publicly available data. Fuel and O&M costs area also available through the U.S. Energy Information Administration's website, and are based on utility self-reported costs.

Based on this analysis of publicly-available data, it appears that Dolet Hills lost *more than $207 million* on the SPP energy market from 2014 through 2017. It is important to note that this estimate of losses is likely conservative because it does not account for fixed operations and maintenance and capital costs. Those are operational losses that are ultimately borne by SWEPCO ratepayers.

Figure 11: Dolet Hills Net Energy Revenues in SPP



SWEPCO's non-economic operation of Dolet Hills is confirmed with SWEPCO's own production cost data provided in this IRP proceeding. According to the Company's Confidential Addendum "SWEPCO IRP Existing Unit Operating Data." the current operating costs of the Dolet Hills plant is [redacted]/MWh. Although that production cost is somewhat lower than the costs that SWEPCO and co-owner Cleco themselves report to EIA through Form 923, the unit is still uneconomic to operate in the energy market. Indeed, even using the Company's conservative costs reported in this docket, compared to the SPP hourly energy prices in the past year (April 2018 through March 2019), the plant would only be economic to operate [redacted] of the time.[32] Yet in the Company's "base" forecast, shows the plant operating at an [redacted] capacity factor in 2019.

As shown below in Figure , over the past year the variable costs of the plant are [redacted] the average monthly SPP price, which is the revenue collected. Thus, even under these conservative, SWEPCO-friendly assumptions, the plant [redacted]. The Company plans to dispatch Dolet Hills seasonally but that is not reflected in the IRP modeling.[33] SWEPCO's final IRP is expected to incorporate this change; but should also report on the whether Dolet Hills is economic even under seasonal dispatch—and the above energy-market analysis suggests it is not.

[32] SPP hourly prices from SNL for April 1, 2018 through March 31, 2019; *see also* Draft IRP, Confidential Addendum "SWEPCO IRP Existing Unit Operating Data" (HSPM).

[33] Draft IRP at 31.

Figure 12: Dolet Hills Variable Costs and Revenues—SWEPCO Costs (HSPM Redacted)[34]

Finally, Cleco Power, the co-owner and operator of Dolet Hills, has itself recognized the diminishing returns at the unit, and committed to operating it only seasonally, when demand (and energy prices) warrant. According to Cleco, the reduced dispatch of the unit will save its ratepayers up to $40 million annually. Meanwhile, in its draft Integrated Resource Plan, SWEPCO refused to conduct any economic or retirement analysis for Dolet Hills, even though the Company was indisputably aware that the unit consistently operates at a loss, is at risk of imminent retirement, and that mothballing or deactivating the unit could result in significantly lower costs for ratepayers. In fact, SWEPCO's draft IRP inexplicably assumes that the already 30-year old plant will continue to operate throughout the planning horizon—for at least another 20 years.

2. Pirkey Is Similarly Uneconomic

H.W. Pirkey in Texas presents a similarly bleak economic scenario. Comparing publicly-available production costs (again derived from S&P Global Market Intelligence data) against the locational marginal prices at SPP's Texas hub (data from SPP) against the estimated production cost of Dolet Hills (derived from SNL data) and the actual operations of those units as reported to EPA's Air Markets Program Dataset ("AMPD"), Pirkey incurred similarly substantial losses.

[34] *See* SPP hourly prices from SNL for April 1, 2018 through March 31, 2019; *see also* Draft IRP, Confidential Addendum "SWEPCO IRP Existing Unit Operating Data" (HSPM).

Figure 13: Pirkey: Production Costs Versus Locational Marginal Price in SPP

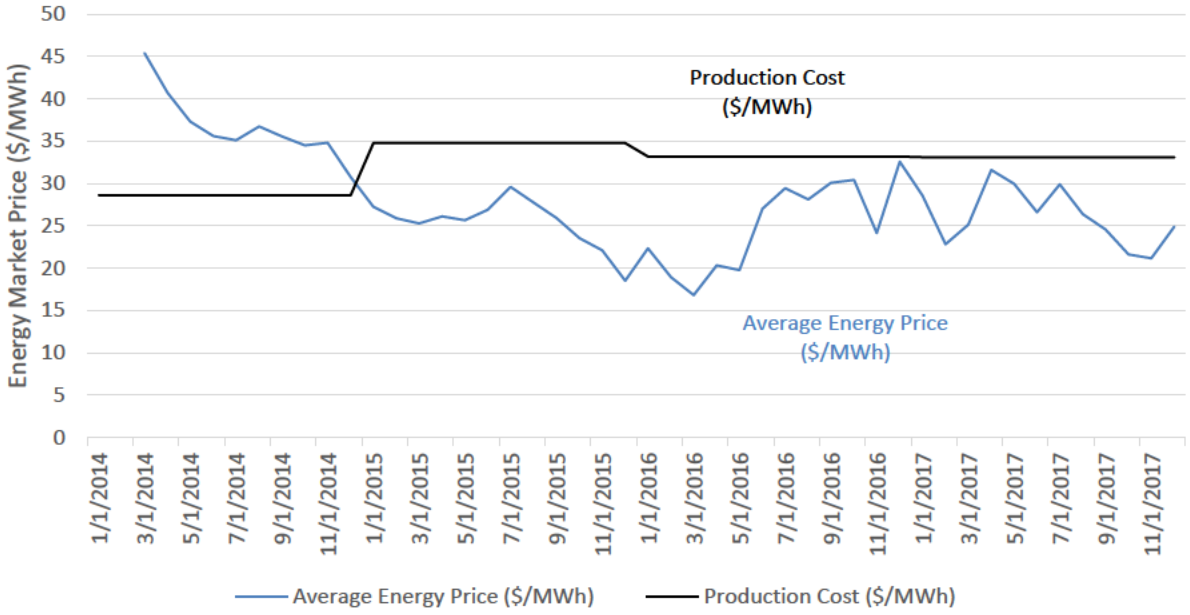
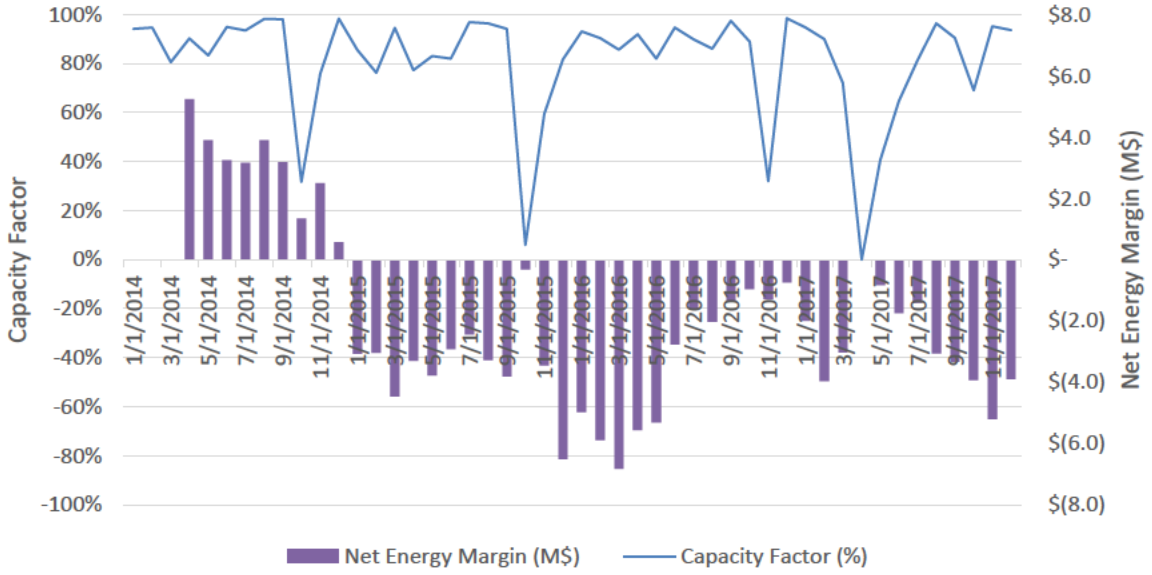


Figure14: Pirkey Net Energy Revenues in SPP



As with Dolet Hills, there is some discrepancy between the data that SWEPCO reports to EIA through Form 923 and the data presented in the Company's Confidential Addendum "SWEPCO IRP Existing Unit Operating Data" in this docket. Nonetheless, even using the Company's conservative data presented in this docket, the Pirkey plant is [redacted] of hours in the past year would the plant have been economic to operate. The Company's 2019 projection shows that it planned to operate it at a [redacted] capacity factor. Shown below in Figure , Pirkey would be losing money, on average, in each of the last 12 months with the exception of November.

This analysis makes clear that certain coal units in SWEPCO's fleet—Dolet Hills and Pirkey, in particular—are uncompetitive in the energy market, and are imposing costs on retail ratepayers, who are effectively subsidizing the uneconomic operation of those plants.[36] And if operational costs increase further or if renewable energy prices continue to decline (as expected), the continued operation of those two plants will impose further risk and cost on ratepayers, who would have lower electricity bills if SWEPCO bought the energy necessary to serve load directly from the market.

D. It is unclear how future environmental compliance costs are included in modeling

Again, one of the core requirements of any IRP is an accounting for significant constraints such as planning, regulatory, operational, reliability and environmental requirements. The IRP "shall take into account the sensitivity of the resource plan to variations in assumptions, including environmental regulations and other relevant assumptions.[37] Moreover the Rules contemplate a reasonable analysis of the potential environmental compliance risks over the planning horizon.[38]

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[35] SPP hourly prices from SNL for April 1, 2018 through March 31, 2019; *see also* Draft IRP, Confidential Addendum "SWEPCO IRP Existing Unit Operating Data" (HSPM).

[36] *See generally* Daniel, Joe, *Backdoor Subsidies for Coal in the Southwest Power Pool: Are utilities in SPP Forcing Captive Customers to Subsidize Uneconomic Coal and Simultaneously Distorting the Market?* (Sierra Club), https://www.sierraclub.org/sites/www.sierraclub.org/files/Backdoor-Coal-Subsidies.pdf

[37] LPSC IRP Rules ¶(3).

[38] *Id.* ¶ (5)(b)(viii)-(ix)

Section 3.3 of SWEPCO's IRP covers "Environmental Issues and Implications" and includes a detailed description of environmental regulations (Section 3.3 is 14 pages long). However, the section fails to summarize the actions SWEPCO has taken to ensure compliance, expected actions needed for future compliance, or information about historical and expected compliance costs. SWEPCO notes that "the following discussion of environmental regulations is based on the assumptions made by the Company and incorporated into its analysis within this IRP"[39] but fails to describe or summarize how environmental compliance was treated in the IRP analysis.

Of the eleven environmental regulations presented in SWEPCO's IRP, SWEPCO discusses the cost implications of compliance in just three instances ().

Figure). SWEPCO uses terms like "significant" and "modest" to describe anticipated compliance costs but falls short of providing any dollar values. When costs are expected to be "significant" (in the case of Coal Combustion Residuals Rule and Effluent Limitations Guidelines and Standards), SWEPCO notes that "initial estimates of anticipated plant modifications and capital expenditures are factored into this IRP"[40] but fails to provide any additional detail. SWEPCO provides more detail about the actions it has taken in the past to ensure regulatory compliance and its own position on various environmental regulations—however, even this type of information is not provided consistently ().

Figure).

Figure 16. SWEPCO IRP Environmental Regulations and Compliance Summary[41]

Regulation	Does the IRP include information about...?		
	SWEPCO's position?	SWEPCO's past or expected actions?	SWEPCO's past or expected compliance costs?
National Ambient Air Quality Standards	Yes	No	No
Regional Haze Rule	No	No	No
Arkansas Regional Haze	No	Yes	No
Louisiana Regional Haze	No	Yes	No
Texas Regional Haze	Yes	No	No
Mercury and Air Toxics Standard	Yes	Yes	No
Cross-State Air Pollution Rule	No	Yes	No
Carbon Dioxide Regulations, including the Clean Power Plan	Yes	Yes	No
Coal Combustion Residuals Rule	Yes	Yes	Yes
Clean Water Act "316(b)" Rule	No	No	Yes
Effluent Limitations Guidelines and Standards	Yes	Yes	Yes

[39] Draft IRP at 31.

[40] Draft IRP at 42, 45.

[41] Draft IRP § 3.3.

Again, the IRP Rules require utilities to include a reasonable analysis of the potential environmental compliance risks over the planning horizon.[42] This should include an analysis of a reasonable range of outcomes.

Despite the current EPA's attempts to roll back certain public health protections, complying with the Clean Air Act and Clean Water Act and their implementing regulations will cost SWEPCO's ratepayers significantly. Given that several of SWEPCO's solid fuel plants have outdated controls, it is unreasonable to assume *zero* environmental compliance costs for the next 20 years. The difference between properly accounting for the risks these regulations present to continued operation of coal units, and discounting these risks to zero could impose detrimental risks on SWEPCO's customers.

While it is true that the precise costs or timing of regulations may be uncertain, SWEPCO can and should develop a range of costs to comply with Clean Air Act and Clean Water regulations. Indeed, the Company has incorporated an estimated range of costs for compliance with carbon dioxide regulation. It should do the same for other environmental compliance risks.

1. Carbon Dioxide

SWEPCO's IRP incorporates a single carbon price commensurate with the implementation of the Clean Power Plan into its modeling analyses.[43] While SWEPCO deserves credit for recognizing some form of carbon regulation, the Company should reevaluate a carbon price adder, especially in the mid- to later-years of the planning analysis. To achieve the carbon reductions necessary to avoid catastrophic climate change impacts, it is highly likely that additional carbon reductions or a carbon tax will be implanted during the planning period, and we encourage SWEPCO to model a range of costs.

2. Regional Haze

While EPA recently approved Louisiana's regional haze SIP for the first planning period, and recently proposed a regional haze trading plan for Texas,[44] the Louisiana SIP has already been challenged in the Fifth Circuit Court of Appeals, and the Texas trading plan will almost certainly face judicial review.[45] If either of those plans are invalidated, SWEPCO will likely be required to reconsider sulfur dioxide and nitrogen oxide pollution reductions at each of its solid-fuel burning power plants. Even if both of the regional haze plans are upheld, each of SWEPCO's coal plants

[42] LPSC IRP Rules ¶ (5)(b)(viii)-(ix)

[43] Draft IRP at 40-41, 65.

[44] Approval and Promulgation of Implementation Plans; Louisiana; Regional Haze State Implementation Plan, 82 Fed. Reg. 60,520 (Dec. 21, 2017); Promulgation of Air Quality Implementation Plans; State of Texas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan: Proposal of Best Available Retrofit Technology (BART) and Interstate Transport Provisions, 83 Fed. Reg. 43,586 (Aug. 27, 2018).

[45] *See Sierra Club v. U.S. EPA*, No. 18-60116 (5th Cir.) (Louisiana SIP challenge). The Texas regional haze plan has been tied up in litigation for the last three years, and will likely be litigated for several years.

must be reevaluated in 2021, when the state's regional haze plan for the second planning period is due.

With that timeline in mind, and given that cost estimates are readily available for pollution reduction technologies typically required under regional haze,[46] SWEPCO should include a sensitivity reflecting compliance. SWEPCO's IRP fails to evaluate, let alone acknowledge, the potential costs associated with a revised regional haze rule for its Louisiana or Texas facilities. To inform a more robust and rigorous analysis, SWEPCO should, at a minimum include potential regional haze compliance costs in its Environmental scenarios.

3. Effluent Limitations Guidelines and Coal Ash

Similar to the compliance risks associated with regional haze, SWEPCO has already obtained cost estimates for compliance with Clean Water Act effluent limitations guidelines, as well as coal ash disposal regulations.[47]

The effluent limitations guidelines impose stringent technology-based effluent limitations on new and existing discharges of several common waste streams at coal-burning power plants, including fly and bottom ash transport water, and wastewater from flue gas desulphurization systems. *See* 40 C.F.R. § 423.13. The ELG Rule requires power plants to comply with the updated effluent limitations "as soon as possible" after November 1, 2018, and no later than December 31, 2023.[48] These limits must be incorporated into any NPDES permit, and require compliance no later than 2023.

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[46] In the Louisiana Public Service Commission proceeding involving Cleco's request for authority to recover the costs associated with complying with the Mercury and Air Toxics Rule, evidence was presented estimating potential compliance costs for installing additional pollution controls to reduce sulfur dioxide and nitrogen oxide emissions at the Dolet Hills plant, which is co-owned by SWEPCO. *See* LPSC Docket No. U-32507 (Direct Testimony of Jeremy Fisher filed Nov. 8, 2013) (noting that the cost to install a new scrubber at Dolet Hills could be as much as $341 million). SWEPCO itself presented similar cost estimates for nitrogen oxide and sulfur dioxide controls at each of its power plants in a recent rate case before the Public Utility Commission of Texas. *See, e.g., Application of Southwestern Electric Power for Authority to change Rates*, Texas Pub. Utilities Comm'n Docket No. 46449 (Direct Testimony of Mark A. Becker filed Dec. 16, 2016). In any event, to conduct an informative environmental compliance risk sensitivity, it is not necessary to have precise cost and engineering estimates for these controls. Instead, general cost estimates, which are readily available in the industry, are sufficient.

[47] Again, in the LPSC proceeding involving Cleco's request for recovery of the MATS Rule retrofits, Cleco obtained and submitted evidence regarding specific cost estimates for compliance with the ELG and CCR Rules at Dolet Hills. As the co-owner of Dolet Hills, SWEPCO has access to the same cost estimates. Moreover, given that SWEPCO has repeatedly characterized Pirkey as "similar" to Dolet Hills, the cost estimates for Dolet Hills should provide a reasonable point of reference for Pirkey. *See, e.g.,* PUCT Docket No. 46449 (Rebuttal testimony of SWEPCO witness Thomas Brice filed May 19, 2017) ("Pirkey and Dolet Hills are very similar plants of the same vintage and operating characteristics").

[48] 80 Fed. Reg. 67,854.

In addition, on April 12, 2019, the Fifth Circuit Court of Appeals invalidated EPA's effluent limitations for other waste coal plant streams, including leachate from landfills and legacy wastewater because the previous EPA limits were *insufficiently* protective and did not reflect "best available technology" for those specific wastewater streams.[49] As a result, EPA will be required to impose new, more stringent limits on those waste streams.

Similarly, EPA's Coal Ash Combustion Residual ("CCR") waste CCR Rule, 80 Fed. Reg. 21,302, remains in place and establishes national minimum criteria for semi-annual groundwater monitoring requirements which trigger corrective action obligations at lined impoundments and closure obligations at unlined ones.

Despite uncertainties surrounding the timeline for implementing EPA's coal ash and wastewater rules, SWEPCO should include those costs in its Environmental scenario runs. At a minimum, SWEPCO should incorporate a non-zero cost estimate for these environmental compliance risks.

Recommendations:

1. **The Company should conduct robust modeling of existing unit retirement.** The Company should conduct modeling that optimizes both new and existing units. This would allow for economic retirement of existing units and, in the event of the model choosing retirement, a lower-cost plan for ratepayers. This modeling should incorporate all of the recommendations below.

2. **The Company should update its natural gas and coal prices.** The fuel price forecasts being used in the IRP are substantially favorable to coal generation and would skew modeling results towards keeping coal generation. Therefore, this step must be done before conducting new modeling. Low, base, and high coal prices should also be modeled separately from low, base, and high natural gas prices. Finally, the Company should present a forecast of costs of lignite for the Dolet Hills and Pirkey units.

3. **The Company should dispatch its units economically.** Self-commitment of SWEPCO's units simply costs SWEPCO ratepayers more while saving SPP customers at-large. The Company's modeling in the IRP should also reflect economic dispatch, if it does not already.

4. **The Company should incorporate future environmental compliance costs in modeling.** It is unclear if these future costs are included in the Company's modeling. If they are not, then the Company is omitting a major risk from coal generation that ratepayers could be forced to pay at a later date. Anticipating compliance costs can lead to earlier resource retirement, which would save ratepayers later.

II. SWEPCO Should Improve Its Model Structure and Assumptions to Expedite Renewable Resources and Increase DSM.

SWEPCO IRP preferred plan includes an aggressive amount of renewable resources and a small level of energy efficiency. We support that aspect of the Company's analysis, but SWEPCO could pursue even more clean resources in the following ways:

[49] *See Southwestern Electric Power Company v. U.S. EPA*, No. 15-60821 (5th Cir. Apr. 12, 2019).

- **The Company procures a large amount of low-cost solar and wind but could do so earlier.** The Company places what appear to be arbitrary limits on solar and wind capacity. But it should take advantage of lapsing tax credits. The Company also assumes self-build resources while it could procure resources through a competitive RFP (as other utilities have done recently). Procuring more solar and wind upfront so would also bring more jobs to Louisiana sooner.

- **The Company assumes costs for wind and solar that are too high.** Recent data shows lower costs for these resources. By modeling higher costs, the Company's modeling would disfavor adding more renewable resources.

- **The Company's presentation of its energy efficiency is inaccessible for third-party review.**

- **The Company should include modeling of portfolios or combinations of resources.** This would ensure the analysis captures resource options and value propositions that occur outside of traditional energy planning.

A. The Company procures a large amount of low-cost solar and wind but could do so earlier

The IRP also assumed that new wind resources would not be available to come online until 2022 and new solar resources would not be available until 2021, "due to the amount of time necessary to secure resources and obtain any necessary regulatory approvals."[50] However, if SWEPCO issued a Request for Proposals (RFP) for power purchase agreement bids (which may include additional requirements, such as duration, deliverability or pre-qualifications), it could take advantage of Production Tax Credits (PTCs) that begin to decline in 2020; tax credits decline to 80 percent, 60 percent and 40 percent of their 2020 value in 2021, 2022 and 2023, respectively. However, four-year delays on PTCs are available if "adequate construction has commenced."[51] If SWEPCO were able to achieve "adequate construction" on a renewable asset purchase by 2023, it may be eligible to obtain PTCs through 2027. Neither option was considered in the IRP analysis conducted in SWEPCO's 2019 IRP—which has the effect of biasing resource selection against potential least-cost renewable options in the shorter-term. The International Finance Corporation's guide for solar developers states that "solar installations can be built relatively quickly, often in 6–12 months, compared to hydro and fossil fuel projects that require more than 4–5 years to complete."[52] The European Wind Energy Association says that utility-scale wind projects (50 MW) can be built in six months.[53]

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[50] Draft IRP at 91.

[51] *Id.*

[52] International Finance Corporation, *Utility-Scale Solar Photovoltaic Power Plants: A Project Developer's Guide* at 3, *available at* https://www.ifc.org/wps/wcm/connect/f05d3e00498e0841bb6fbbe54d141794/IFC+Solar+Report_Web+_08+05.pdf?MOD=AJPERES.

[53] European Wind Energy Association, *Wind energy's frequently asked questions (FAQ)*, *available at* http://www.ewea.org/wind-energy-basics/faq/.

SWEPCO's IRP notes that yearly capacity limitations are placed on solar resources (300 MW) and wind resources (600 MW) in modeling because "there is a practical limit as to the number of sites that can be identified, permitted, constructed, and interconnected by SWEPCO in a given year."[54] No such yearly capacity limitations are placed on other types of capacity, though presumably there is a practical limit to the annual buildout of any single generating resource. In addition, SWEPCO's IRP does not present evidence to back up the assumed buildout limitations of renewable resources.

In addition to the annual capacity limitations placed on wind and solar resources, maximum capacity thresholds over the entire planning period were also applied to wind and solar resources: 2,000 MW and 1,300 MW respectively.[55] Beyond mentioning that solar additions were "limited to approximately 15% of SWEPCO's load obligation," no further justification is provided for these limits.

We estimate the number of direct jobs (on-site construction jobs) that could be created from SWEPCO's planned investments in renewable energy projects in two steps. First, we calculate the planned solar and wind capacity additions in MWs using data for SWEPCO's planned power capacity by type.[56] Second, we calculate the product between the capacity additions in MWs and the estimated job creation per MW of capacity invested. In particular, we assume that utility solar projects can create 3.9 job-years per MW installed while onshore wind has the potential to create 0.9 job-years per MW.[57]

Figure below shows the estimated number of jobs created (in job-years) for SWEPCO. SWEPCO's investments could create 6,270 job-years during the period 2022-2032, or an average of 523 jobs in each year. About 81 percent of this number would be jobs from solar, while the remaining 19 percent would be jobs created from wind investments. These do not include spin-off impacts (i.e. suppliers) or jobs from operations.

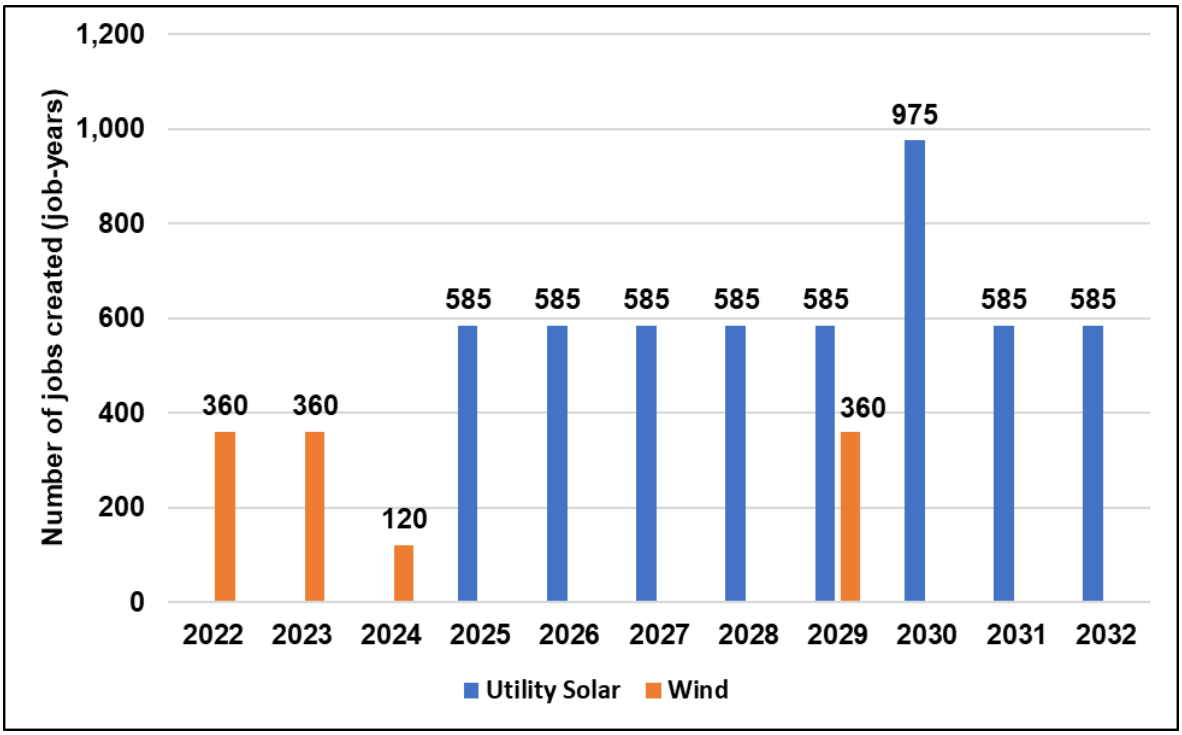
[54] Draft IRP at 88.

[55] *Id.* at 88, 92.

[56] For SWEPCO, the data come from Table 15 of its Draft IRP, while for CLECO the data come from Figure 17 in its Draft IRP.

[57] Jones, B., Philips, P. & Zabin, C, *The Link Between Good Jobs and a Low Carbon Future: Evidence from California's Renewables Portfolio Standard, 2002—2015* (Donald Vial Center on Employment in the Green Economy. Center for Labor Research and Education. University of California, Berkeley 2016), *available at* http://laborcenter.berkeley.edu/pdf/2016/Link-Between-Good-Jobs-and-a-Low-Carbon-Future.pdf.

Figure 17. SWEPCO Predicted job creation from solar and wind planned investments[58]



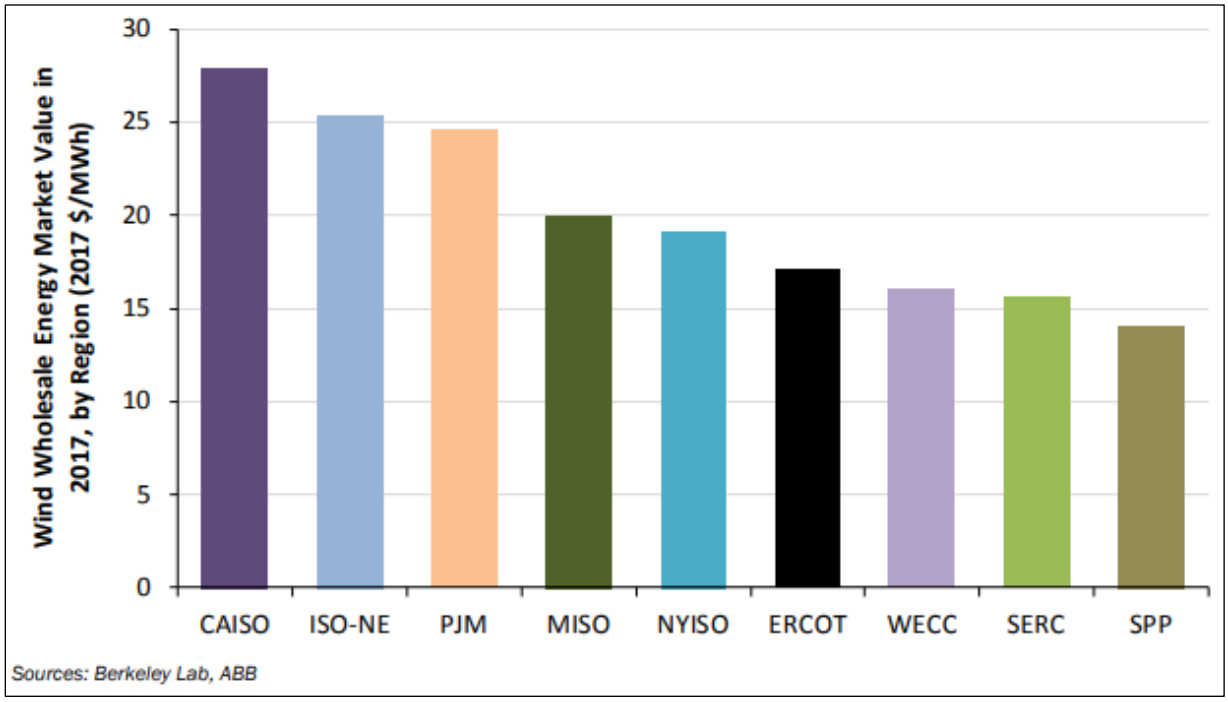
B. The Company assumes costs for wind, solar, and batteries that are too high.

SWEPCO's IRP assumes the 2021 LCOE of wind to be $21.85/MWh plus $6/MWh levelized congestion and losses—for a total of $27.85/MWh. This is substantially higher than the 2017 nation-wide generation-weighted average levelized wind PPA price—$18.91/MWh.[59] In 2017, SPP had the lowest average wind PPA price of any power market in the country at $14/MWh (Figure 1).

[58] Draft IRP, Table 15. Job creation per MW data obtained from Jones, B., Philips, P. and Zabin, C, *The Link Between Good Jobs and a Low Carbon Future: Evidence from California's Renewables Portfolio Standard, 2002—2015* (University of California Berkeley 2016, http://laborcenter.berkeley.edu/pdf/2016/Link-Between-Good-Jobs-and-a-Low-Carbon-Future.pdf; Halvatzis, S. and Keyser, D., *Estimated Economic Impacts of Utility Scale Wind Power in Iowa* (National Renewable Energy Laboratory (NREL) Nov. 2013), *available at* https://www.nrel.gov/docs/fy14osti/53187.pdf; Reategui, S. and Hendrickson, S, *Economic Development Impact of 1,000 MW of Wind Energy in Texas* (National Renewable Energy Laboratory (NREL) Aug. 2011), *available at* https://www.nrel.gov/docs/fy11osti/50400.pdf; Tegen, S. et al., *Economic Impacts from Indiana's First 1,000 Megawatts of Wind Power* (National Renewable Energy Laboratory (NREL) Aug. 2014), *available at* https://www.nrel.gov/docs/fy14osti/60914.pdf.

[59] National Renewable Energy Laboratory, Wind Technologies Market Report, Figure 51 (2017). https://emp.lbl.gov/sites/default/files/2017_wind_technologies_market_report.pdf.

Figure 1. Regional wholesale energy market value of wind in 2017, by region[60]



"Large-scale solar resources were made available in two tiers, with up to 150MW of each tier available each year beginning in 2021, for a total of up to 300MW annually. Initial costs for Tier 1 were approximately $1,180/kW in 2021 with the ITC. Tier 2 has an initial cost of approximately $1,310/kW in 2021 with the ITC."

To compare costs with the National Renewable Energy Laboratory (NREL) overnight capital costs for solar, the 2021 ITC of 22% was removed. The resulting Tier 1 and Tier 2 large scale solar costs ($/kW) are approximately $1,341 and $1,489 respectively. Lastly, NREL's capital costs were converted from direct current (DC) to alternating current (AC), using NREL's 1.2 DC to AC ratio, to be comparable with the SWEPCO numbers (which are in AC). The resulting NREL overnight capital cost ($/kW) is $1,082, considerably lower than the SWEPCO Tier 1 and Tier 2 costs.

Similarly, SWEPCO overestimates the costs of battery storage, which have declined to as low as $103/MWh, far lower than the $175/MW/h assumed by the Company.[61] In addition, it appears that SWEPCO's analysis is unduly limited to a single battery storage option.[62] SWEPCO should expand the options available and include a two-hour option, which provides for different

[60] Reproduced from: U.S. Department of Energy, *Wind Technologies Market Report*, Figure 53 (2017), *available at* https://www.energy.gov/sites/prod/files/2018/08/f54/2017_wind_technologies_market_report_8.15.18.v2.pdf.

[61] *Compare* Draft IRP at 82, *with* Lazard, Lazard's Levelized Cost of Energy Analysis, version 12 (2018).

[62] Draft IRP at 82.

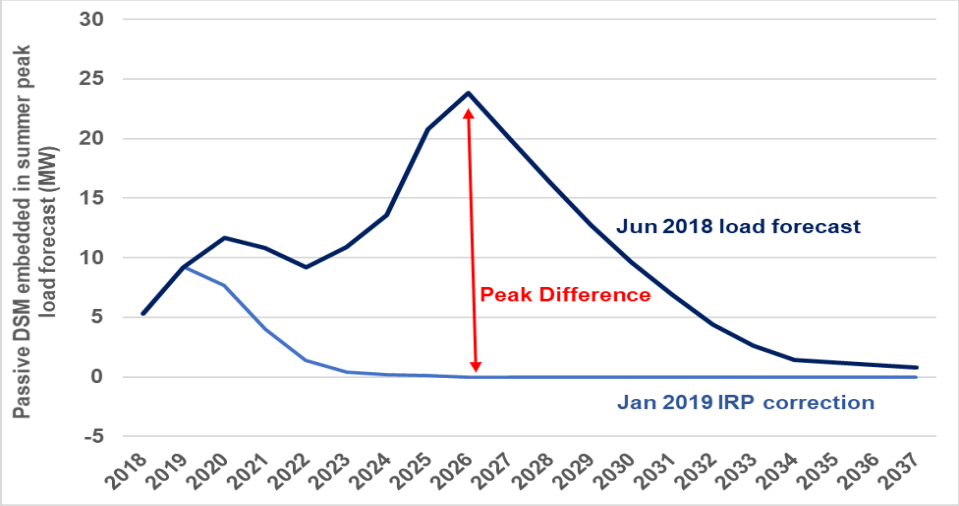
operational capabilities and benefits depending on the time of day that the resource is deployed. Finally, as discussed in more detail below, SWEPCO should allow its modeling to select among portfolios of options including solar or wind coupled with batteries, which together can serve a wide variety of reliability needs, load types, and can be deployed to coincide with the load curve.[63]

C. The Company's presentation of its energy efficiency is inaccessible for third-party review.

In its IRP, SWEPCO states that a certain amount of passive demand-side management/energy efficiency ("passive DSM") is embedded into its load forecasts. The amount of passive DSM that is embedded is meant to represent: 1) changes in the efficiency of various end-use appliances, and 2) state-approved DSM program impacts.

SWEPCO's assumptions about how much passive DSM is included in its load forecast decreased between June 2018 (when SWEPCO conducted its load forecast) and January 2019 (when SWEPCO submitted its IRP).[64] In its IRP, SWEPCO assumes that state-approved DSM programs ramp down in 2021. The impact of this change between the load forecast and the IRP results in a maximum increase in summer peak demand of 24 MW in 2026 (Figure 29).

Figure 29: Difference between passive DSM in SWEPCO June 2018 load forecast and January 2019 IRP (assumed to be cumulative)[65]



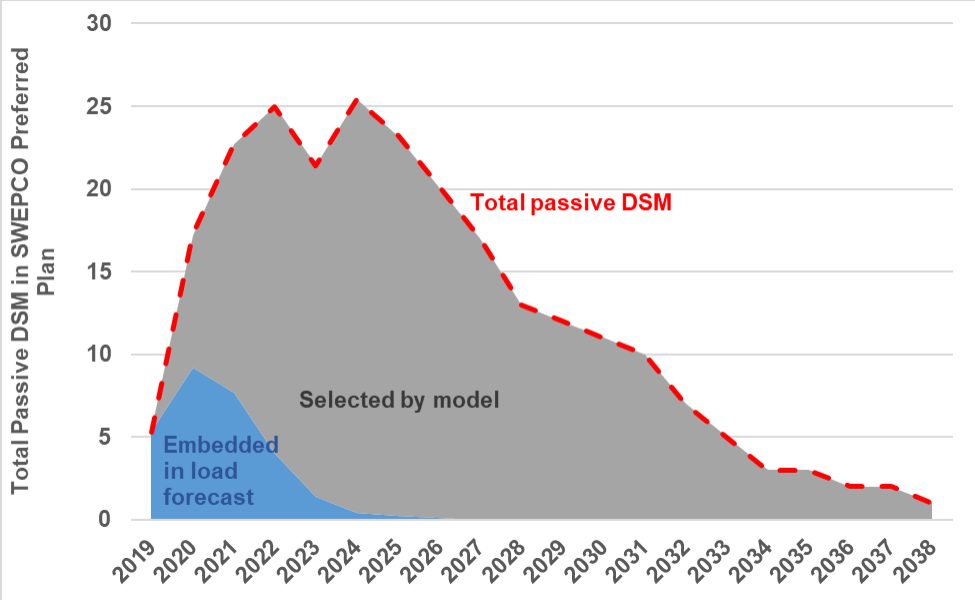
[63] *See, e.g.*, AES Energy Storage, *About the AES Alamitos Modernization Project* (2015), http://www.renewaesalamitos.com/AES-Alamitos-Fact-Sheet-2015.pdf (Describing AES's Aliso Canyon battery project, a 200 MW "flexible resource" because the system can be used as 100 MW of storage capacity during off-peak times and then as 100 MW of flexible capacity during times of peak demand).

[64] In SWEPCO's IRP Appendix, Table A-12 shows the results of the June 2018 passive DSM load forecast and Table A-16 shows the January 2019 passive DSM load forecast adjusted for the SWEPCO's assumptions regarding a state-approved DSM sunset. Table A-16 is the embedded passive DSM that SWEPCO uses in its load forecast for the IRP.

[65] Draft IRP, Appendix, Exhibit A, Tables A-12 and A-16.

SWEPCO's IRP also models additional passive DSM as a resource for future capacity, in addition to the amount embedded in the load forecast. Beginning in 2020, a total of 721 GWh (equal to 2 percent of SWEPCO's total load) was made available for resource selection in modeling.[66] The passive DSM included in SWEPCO's preferred plan reaches a maximum of 25 MW in 2022 and again in 2024 (Figure 30).

Figure 30: SWEPCO IRP passive DSM forecast reduction[67]



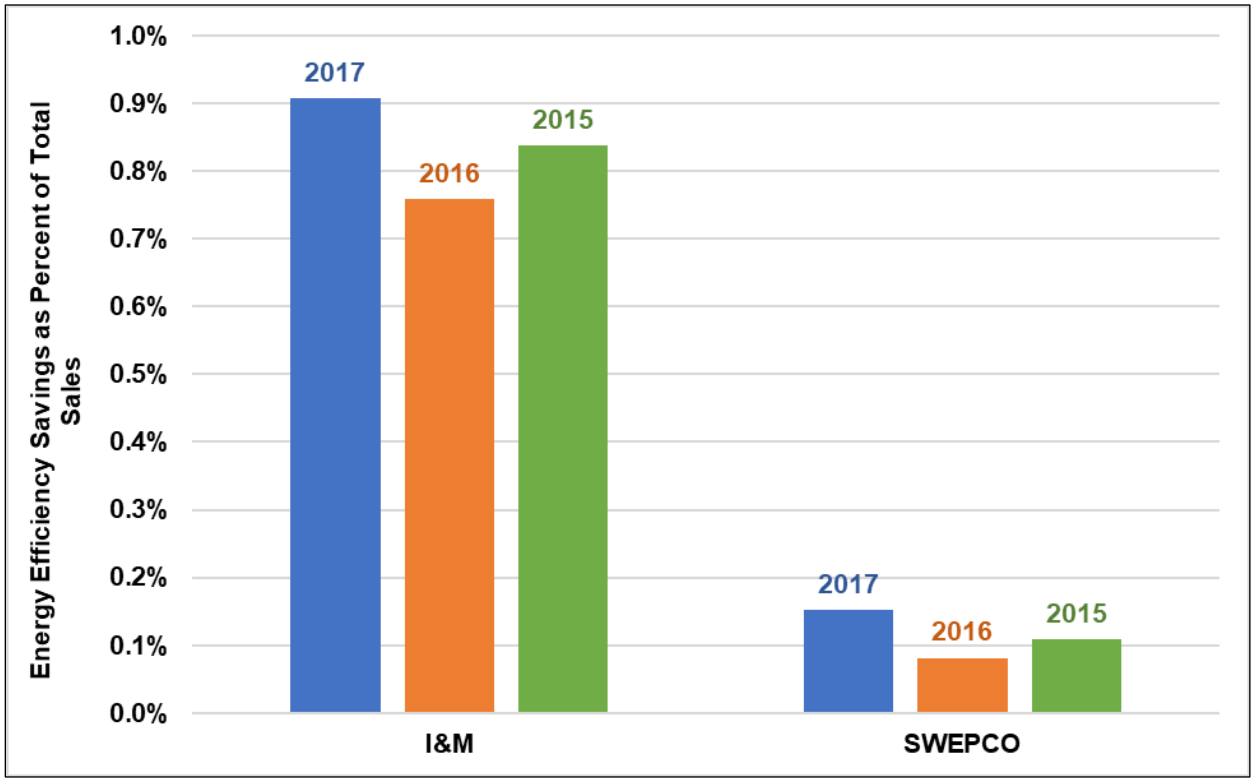
SWEPCO's presentation of its treatment of passive DSM in its IRP is not transparent for third-party review and no explanation is provided for why SWEPCO assumes that state-approved DSM ramps down in 2021.

According to U.S. Energy Information Administration data, SWEPCO's achieved average energy efficiency savings equal to 0.11 percent of its total electric sales between 2015 and 2017. Indiana Michigan Power, another AEP subsidiary located in Indiana, achieved 0.83 percent of total sales in energy efficiency savings over the same period (Figure 4).

[66] Draft IRP at 76.

[67] Draft IRP, Appendix, Exhibit A (Table A-16) and Exhibit G.

Figure 4. Energy efficiency (total incremental annual savings, MWh) as percent of total annual sales (MWh)[68]

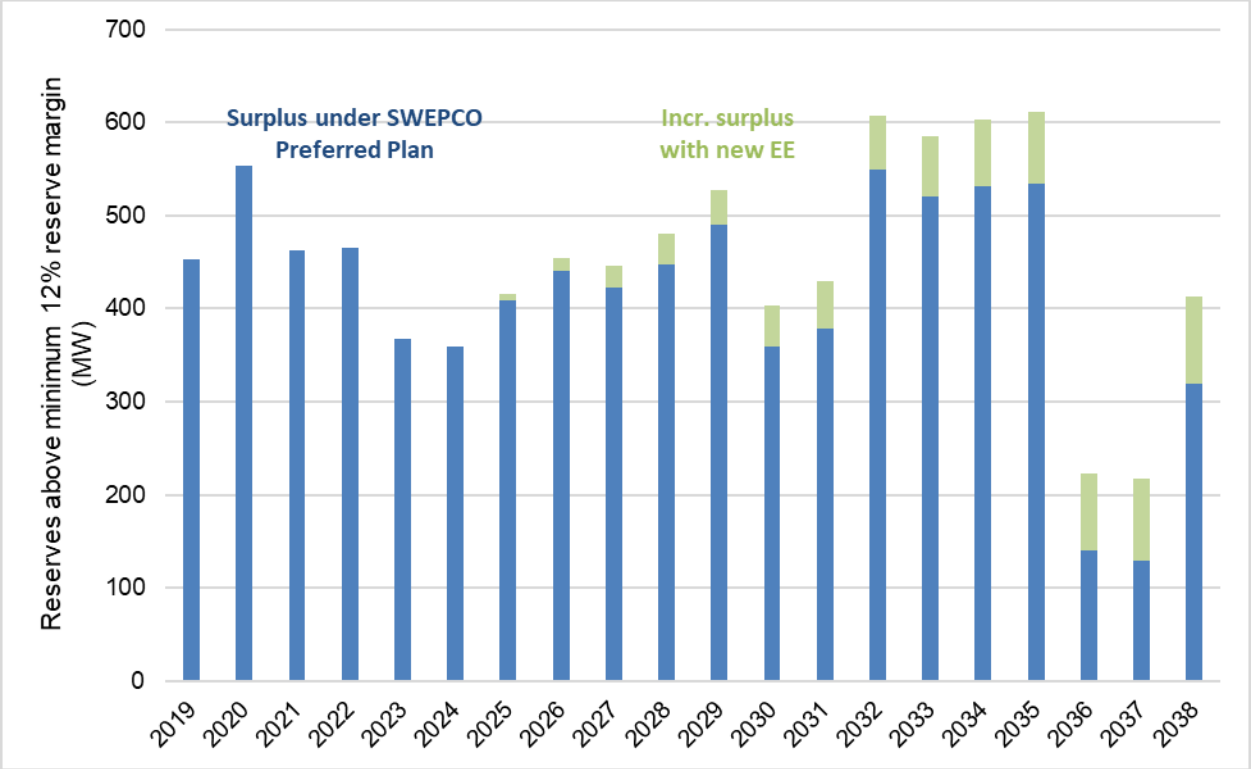


SWEPCO's Preferred Plan includes 218 MW of energy efficiency through 2038. However, the amount of energy efficiency included in the Preferred Plan only increases year-on-year through 2024 (with one exception: it decreases between 2022 and 2023 by 1 MW), after which point annual energy efficiency savings decrease year-on-year through the remainder of the planning period. We modeled what SWEPCO's capacity position would be if SWEPCO were to continue to increase energy efficiency savings year-on-year after 2024 by 5 MW: the average amount that SWEPCO's energy efficiency savings increased between 2019 and 2024. The results are shown in

Figure 5, which demonstrate that—if SWEPCO were to commit to increasing energy efficiency every year in the planning period—their capacity surplus position would rise by 7 MW in 2025 up to 94 MW in 2038.

[68]U.S. Energy Information Administration (EIA), *Annual Electric Power Industry Report*, Form 861, https://www.eia.gov/electricity/data/eia861/.

Figure 5: SWEPCO Preferred Plan Surplus Capacity with 5 MW energy efficiency savings year-on-year[69]



Recommendations:

1. **The Company should procure solar and wind earlier to take advantage of lapsing tax credits.** The Company should not place arbitrary limits on renewable additions and should pursue competitive bids for power purchase agreements, in addition to self-build options.

2. **The Company should estimate the job impacts from its resource buildout.** It is clear that solar and wind installations will create jobs. If the Company finds that retirement of existing units is economic, it should measure the job impact of that retirement and the impacts from new resource procurement

3. **The Company should procure new energy efficiency after 2025.** Doing so would provide an additional 95 MWs of capacity relative to the preferred plan, for 2038.

D. The Company should include modeling of portfolios or combinations of resources.

Setting up long term, least cost planning typically involves the modeling of existing and potential resources on an economic basis to minimize the costs of providing power to ratepayers. These resources typically include internal supply and demand-side resources, market purchases, and power purchase agreements ("PPA's"). There are various reasonable ways to model resource plans, but based on the initial assumptions, it is important that SWEPCO avoid constraining its model in

[69] Draft IRP at 164.

ways that could "hardwire" certain resource choices or result in less-than-optimal addition of supply- and demand resources. Specifically, it is important that SWEPCO's model does not inadvertently exclude combinations of options that deserve consideration. This might occur in one of four ways: (a) through manually-selected resource portfolios, (b) through overly-constrained model structures, (c) by failing to capture critical revenue streams that occur outside of traditional energy planning, and (d) by failing to assess the value of resource combinations, rather than single resources.

In the first instance, future resource portfolios are user-defined, rather than selected by the model, thus creating future resource portfolios that are suboptimal – or potentially largely not cost effective. It is critical that the Company *minimize manual portfolio decisions* and prescreening options. As an example, the Company should ensure that the Aurora model has ability to fully optimize SWEPCO's portfolio, including the ability to select existing units for cost-effective retirement ("endogenous retirement") and use of a range of demand-side resources and storage to meet demand. Failing to examine existing large fossil units for potential cost-effective retirement pre-judges the efficacy of those resources and denies ratepayers the opportunity to achieve lower cost (and cleaner) energy options.

Additionally, SWEPCO's assumptions appear to include a "cap" on wind and solar energy resources. For wind, the Company has manually capped the addition of new wind at 1,900 MW, with a 600 MW annual limit. This amount of wind energy would provide roughly 40% of SWEPCOs energy. For solar, the cap is 1,300 MW over the planning horizon, with a 300 MW annual limit. This would be approximately 15% of SWEPCO's energy demand. We note that other utilities have exceeded these levels of wind and solar in their modeling. In particular, in May 2018, MidAmerican announced plans to develop enough wind energy to provide 100% renewable energy to its customers by the early 2020s.[70]

We do not suggest that SWEPCO must adopt a 100% renewable energy resource portfolio, but models in which the optimization is overly constrained may fail to examine cost effective portfolios simply due to those constraints. An example of an overly constrained model is by allowing only the addition of large blocks of highly modular renewable energy options (such as wind or solar), or limiting the availability of these options outside of real-world constraints. As an example, it appears as though SWEPCO is evaluating only one option for battery storage, which provides four hours of energy, even though there are readily available two-hour options.

Relatedly, there are many benefits to demand-side management ("DSM") and storage resources that are not captured through traditional capacity-expansion modeling. For DSM, avoided transmission and distribution investments are real and avoidable costs that are often not priced into the value of the DSM resource. For storage, additional value streams for frequency regulation, voltage support, ramping capability, and blackstart capability are not effectively captured by traditional resource planning. It is important that the Company seek to ensure that the model appropriately recognizes those many benefits of DSM and storage options. One method for doing so would be through either assessment of those value streams outside of the model structure (and subsequent repricing in the model).

[70] https://www.midamericanenergy.com/news-article.aspx?story=858.

Finally, traditional capacity expansion modeling does not recognize the energy shifting value of storage or demand response, a critical value when integrating substantial new renewable energy. An effective use of utility-scale storage paired with solar can shift the solar to peak period requirements, thus improving the capacity capabilities of solar. Using those resources to shift peak demand can enhance the capabilities of wind. In total, a packaged combination of these resources would show a much higher value in traditional resource planning than any of these resources on their own.

Increasingly, utilities and experts are looking to this modular portfolio planning as a way of meeting needs rather than relying on specific technology solutions. Rocky Mountain Institute recently published a method for developing and evaluating "clean energy portfolios" designed to meet (or exceed) the capabilities of new gas-fired units at competitive costs.[71] Public Service Company of New Mexico ("PNM") recently issued an all-source request for proposals ("RFP") in which the Company will seek to assess and integrate all bids, including packaged renewable energy, storage, demand-side resources, and distributed energy solutions.[72] Similarly, the city of Glendale, California issued an all-source RFP for 171 MW of generation, seeking to create a "virtual power plant" from modular bids down to 1 MW in size.[73] As a demonstration, Southern California Edison ("SCE") recently completed the procurement of resources in their "Preferred Resources Pilot," a project to replace the sudden closure of the San Onofre Nuclear Generating Station ("SONGS"); in that project, SCE successfully procured 238 MW from contracted resources including energy efficiency, demand response, behind-the-meter renewables, energy storage, and combined heat and power.[74] Similarly, Xcel Energy Colorado recently conducted an all-source RFP and received over 400 bids, most of which were for renewable resources, with the median bid for stand-alone wind energy resources $18.10/MWh. Adding battery storage to wind energy resulted in median bids of $21/MWh. Moreover, Xcel received 152 bids for solar projects comprising more than 13 GW of capacity, with the median bid $29.50/MWh. Coupling solar with battery storage resulted in bids for $36/MWh.[75]

Those all-source RFP processes make clear that significant renewable alternatives are, in fact, available. Recent studies and analogous RFPs confirm the potential for similar results in Louisiana. Indeed, in a recent (albeit limited scope) RFP for only 5 MW of solar capacity, Entergy New Orleans received 17 different qualifying proposals representing approximately 325 MW of capacity.[76]

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[71] Mark Dyson, Alexander Engel, and Jamil Farbes, *The Economics of Clean energy Portfolio How Renewable and Distributed Energy Resources Are Outcompeting and Can Strand Investment in Natural Gas-Fired Generation* (Rocky Mountain Institute May 2018), *available at* https://www.rmi.org/insights/reports/economics-clean-energy-portfolios/.

[72] https://www.pnm.com/rfp.

[73] http://www.glendaleca.gov/home/showdocument?id=44964.

[74] https://www.sce.com/wps/wcm/connect/d7cb7297-cbc4-4766-a640-e01e9fd0adc1/020317_PRP_PortfolioDesignReport.pdf?MOD=AJPERES.

[75] Xcel Energy, *2016 Electric Resource Plan, 2017 All Source Solicitation 30-Day Report (Public Version)*, CPUC Proceeding No. 16A-0396E (Dec. 28, 2017).

[76] Entergy New Orleans, *Application of Entergy New Orleans, Inc. for Approval to Construct Distributed Generation Scale Solar Photovoltaic Systems and Request for Cost Recovery*, Docket No. 17-05 (Oct. 2017) (Direct Testimony of Seth Cureington).

Moreover, studies demonstrate that there is substantial distributed energy potential, load shaping, and interruptible load potential in the state—as much as 3,000 MW.[77] SWEPCO should ensure that its resource planning process is able to capture these cost effective resources and deploy them intelligently, rather than just moving to single central-station technology resources.

Recommendations

1. SWEPCO should ensure that the model is allowed to pick partial blocks of resources wherein block size is not a barrier (such as solar and wind), and pick reasonable partial blocks of other resources where capacity can be shared between utilities.

2. SWEPCO should be sure to not overly constrain the model including ensuring that it minimizes manual portfolio decisions and prescreening.

3. SWEPCO should ensure that it captures avoided costs that are provided by certain resources that occur outside of traditional energy planning. Ideally, this would be done through an assessment of those value streams outside of the model structure (and subsequent repricing in the model).

4. Ensure Aurora model has ability to fully optimize the SWEPCO portfolio, including retirements and demand side resources.

CONCLUSION

Incorporating the recommendations that are listed above will help ensure that the ratepayers of Louisiana continue to enjoy the reliability and affordability that SWEPCO has provided in the past. Sierra Club looks forward to reviewing SWEPCO's final IRP, and continuing to participate in subsequent stakeholder proceedings.

Respectfully submitted this 15th day of April, 2019.

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[77] Power and Energy Systems Group, *Eastern Interconnection Demand Response Potential* at B-26 (Oak Ridge National Laboratory Nov. 2012), https://info.ornl.gov/sites/publications/files/Pub37931.pdf.

CERTIFICATE OF SERVICE

I hereby certify that on this 15th day of April, 2019, I served a copy of Sierra Club's Comments on SWEPCO Power's Draft IRP Report by electronic mail on the Official Service List.

/s/ Joshua Smith
Joshua Smith
Sierra Club