SIERRA CLUB

BEFORE THE
ARIZONA CORPORATION COMMISSION

IN THE MATTER OF RESOURCE PLANNING AND PROCUREMENT IN 2019, 2020, AND 2021	Docket No. E-00000V-19-0034

Sierra Club Comments on Tucson Electric Power's 2020 Integrated Resource Plan

1. Introduction

Sierra Club appreciates the opportunity to comment on Tucson Electric Power's (TEP or the Company) 2020 Integrated Resource Plan (IRP). These comments were prepared with the assistance of Synapse Energy Economics, Inc. (Synapse) and are based on our examination of TEP's input assumptions and portfolio construction, and our evaluation of its resource options. Over the last year, TEP solicited input from stakeholders at a number of public workshops as it refined its modeling assumptions, portfolio design, and its final selection of scenarios. It established an advisory council that presented information, provided feedback, and helped to shape the portfolios. Sierra Club participated in the advisory council and submitted comments earlier this year as part of the Pre-IRP process. Sierra Club appreciates the robust process established by TEP. The final comments we submit here focus on TEP's IRP process and modeling assumptions, with the goal of pushing for transparent resource planning that provides customers a reliable electricity system at the lowest possible cost and with the least environmental impact.

TEP does not currently have an acknowledged IRP, therefore we stress the importance of the Company producing a robust and comprehensive IRP at this time. Given the strong level of stakeholder engagement, the Company's evaluation and testing of an extensive number of scenarios and sensitivities (including several recommended by Sierra Club), and the lack of additional fossil build-out contemplated in any of the Company's portfolios, we recommend that the Arizona Corporation Commission (ACC) conditionally acknowledge TEP's IRP based on the Company's commitment to follow our recommendations outlined below and its commitment to aggressively ramp up its emissions reductions in the near term.

2. Summary and recommendations

In our review of TEP's IRP, we find many elements that are laudable, both in methodology and assumptions. Specifically, the Company evaluates an extensive number of portfolios (24 total), some of which consider early retirement and/ or a transition to seasonal operations at

Springerville. TEP also updates its demand-side management assumptions and recognizes the importance of early actions to reduce carbon emissions with the goal to minimize total cumulative carbon emissions.

While we are happy to recognize the positive aspects of the Company's IRP and stakeholder process, we also want to highlight several concerns we have with the Company's methodology and results. Although the Company does not contemplate building any new fossil resources, it recently built 10 natural gas-fired Reciprocating Internal Combustion Engine ("RICE") units at the Sundt Generating Station[1] and purchased 550 MW of natural gas combined cycle capacity at Gila River Unit 2.[2] The Company plans to continue operating most of its existing coal and gas resources for the next decade and beyond. Additionally, the Company's natural gas price forecast is relatively low compared to other industry projections and likely underestimates future natural gas prices. These factors together drive TEP's continued reliance on fossil resources throughout the study period. Additionally, while the Company did test many scenarios, it did not use optimized capacity expansion software to test and evaluate optimal dates to retire and exit its existing Springerville and Four Corners coal plants.

Our concerns are oriented around six key topic areas:

1. **The IRP fails to evaluate COVID-19 impacts on load forecast.** TEP does not mention the impacts of COVID-19 on its near-term load growth projections. This is concerning given the significant impacts this unprecedented event is having across the economy, and the differential impacts it has had on electricity sales across customer classes.

2. **The IRP continues reliance on substantial fossil generation for the IRP period.** Despite TEP's commitment to no new fossil resources, the Company built and purchased significant new natural gas resources just before the IRP window. In doing so, it locked its ratepayers into reliance on gas resources, subjected them to continued fuel price volatility risks, and exposed them to stranded asset risk as the gas markets shifts due to dropping costs of renewable energy and storage. In its IRP, TEP continued to assume heavy reliance on gas, apparently without such risk analysis.

3. **Retirement analysis for existing fossil resources needs to be improved and refined.** TEP did not use optimized capacity expansion modeling to identify optimal retirement dates for its coal fleet. TEP instead has tested a series of retirement scenarios and dates that are hard-coded into the model. While TEP has made significant efforts to solicit and incorporate stakeholder input on

[1] Tucson Electric Power Co., 2020 Integrated Resource Plan at 96, Docket No. E-00000V-19-0034 (June 26, 2020), *available at* https://docket.images.azcc.gov/E000007291.pdf [hereinafter "TEP 2020 IRP"].
[2] *Id.* at 98.

scenarios, a more robust approach would include conducting modeling of both utility-driven scenarios and stakeholder-driven scenarios in capacity expansion mode and allowing for the retirement of Four Corners. This is required in order to appropriately evaluate the economic effect of retention vs. earlier closure of coal plants.

4. **EIM market integration should be studied and incorporated into future resource planning models.** Despite its clear intention to enter the California Independent System Operator's (CAISO) Energy Imbalance Market (EIM) in 2022, TEP has still not incorporated market participation into its IRP modeling.

5. **Gas prices are too low.** TEP's base case gas price forecast continues to be well below the U.S. Energy Information Administration (EIA) Annual Energy Outlook's (AEO) regional projections of delivered gas prices for the electric sector. This decision systematically favors reliance on gas resources.

6. **Impact of electric vehicles (EVs) on load and peak should be studied and better integrated into future load forecasts.** In its IRP, TEP incorporates EV load as a flat, incremental load. This is a reasonable beginning assumption, but EV load can have significant peak impacts if not managed properly.

On the basis of these findings, we offer the following recommendations:

- **TEP should submit a revised IRP that:**
    - Tests an alternative natural gas forecast based on Wood Mackenzie's long-term natural gas price projections, rather than the current low forecast that relies on the growth rates of Wood Mackenzie's long-term natural gas price projections and a different starting point.
    - Tests the costs or savings from imposing more aggressive emissions reductions targets to reduce reliance on generation from fossil resources (concurrently with the natural gas price forecast modifications).
    - Incorporates the impacts of COVID-19 on near-term load growth projections.
- **TEP should develop a plan to incorporate entry into the EIM into its resource planning modeling.**
- **TEP should conduct a detailed study of the economics of continuing to operate Springerville and Four Corners based on:**

- Optimized capacity expansion software to evaluate the optimal retirement dates for its coal plants and the least-cost replacement resources.
- Inclusion of the impact on market prices of coal plant retirements, and the subsequent effect on renewable resource economics**.**

- **TEP should study the impacts of EV load on peak demand and energy. Specifically, the Company should:**
  - Continue to refine its understanding of, and projection around, its own future EV load.
  - Evaluate how EV load can be incorporated with time-of-use (TOU) pricing or other mechanisms that can reduce peak impacts from EV load.
  - Evaluate the impact of Vehicle-to-Grid technologies.

3. No mention of COVID-19 impact on near-term load growth projections

TEP fails to address, or even mention, the impacts COVID-19 may have on its near-term load growth projections. This is concerning given the significant impacts this unprecedented event is having across the economy, and the differential impacts it has had on electricity sales across customer classes. In 2019, approximately 42 percent of TEP's energy was sold to residential customers, 24 percent to commercial rate class customers, and the other 34 percent to industrial and mining rate classes.[3] Residential and commercial growth forecasts are driven by statistical models based on weather, demographics, and economic conditions.[4] The economic conditions that were in place when TEP developed its forecast have clearly changed. In a letter to Commissioner Peterson, TEP acknowledge this change, and stated that residential sales have increased while commercial and industrial sales have decreased since the start of COVID. [5]*It is critical that TEP evaluates changes in sales across rate classes in the time since the COVID impacts began and updates its near-term load forecast to reflect the current economic conditions.*

4. Continued reliance on fossil generation for the IRP period

In its 2020 IRP, TEP evaluates 24 potential portfolios.[6] Each portfolio is designed to test a variety of goals and benchmarks, including TEP's clean energy goals, accelerated coal plant retirement schedules, and DSM program penetration specifications.[7] According to TEP, its final

[3] *Id.* at 32.
[4] *Id.* at 33.
[5] Response to May 20, 2020 Letter, Docket No. AU-00000A-20-0094 (Ariz. Corp. Comm'n Aug. 14, 2020), *available at* https://docket.images.azcc.gov/E000008424.pdf.
[6] TEP 2020 IRP at 15.
[7] *Id.* at 148.

portfolio is one that "represents the best balance of cost, performance, environmental impact, and risk."[8] This portfolio includes no new fossil resources, and replaces all retired fossil resources with renewables, energy storage, and energy efficiency.[9]

TEP's final portfolios include:

- Ramping down and retiring two units at Springerville Generation Station over the next 12 years. Unit 1 transitions to seasonal operations in 2023 and Unit 2 in 2024. Unit 1 is scheduled to retire at the end of 2027 and Unit 2 is scheduled to transition to summer-only operations in 2030 and retire after the summer of 2032;[10]

- Retiring Four Corners in July 2031 when its current coal contract expires;[11] and

- Offsetting the output and capacity from the retired coal resources with new wind, solar, and energy storage systems. TEP has already begun this transition, as it has several projects underway that combined represent 446 MW of new capacity: the Oso Grande and Borderlands Wind Projects in New Mexico, and the Wilmot Energy Center solar-plus-storage project in Tucson, Arizona, both of which are scheduled to come online by next year.[12]

Between 2020 and 2022, TEP will bring online 476 MW of new wind, solar, and energy storage. Through the remainder of the planning period, TEP anticipates adding 2,000 MW of renewable capacity, and 1,400 MW of energy storage systems.[13] Additionally, TEP intends to continue providing cost-effective energy efficiency programs that target reductions in on-peak energy use. Specifically, it plans to target 1.5 percent incremental energy savings over the prior year's retail load in each year through 2024.[14] This is an important commitment to keep bills lower, reduce emissions, save water, and save customers' dollars.

Significant build-out and purchase of new gas capacity just prior to IRP study period

TEP's commitment to build no new fossil resources is commendable, but this move was enabled in large part by TEP's procurement, just prior to the study period, of a significant quantity of new gas peaking and baseload capacity. Specifically, the Company purchased Gila River Unit 2 (one of four units of a natural gas-fired combined cycle electric generating station) and constructed 10 Reciprocating Internal Combustion Engine (RICE) units at its Sundt facility.[15]

[8] *Id.* at 15.
[9] *Id.* at 18.
[10] *Id.* at 15, 93.
[11] *Id.*at 95.
[12] *Id.* at 15.
[13] *Id.* at 24.
[14] *Id.*
[15] *Id.* at 171.

Thus, while TEP frames its IRP to claim no new fossil resources, TEP has in fact locked in substantial fossil capacity since its last IRP.

Regardless of the cost of TEP's recent gas resource acquisitions, it is imperative that TEP evaluate on an ongoing basis the economics of continuing to rely on its existing fossil resources —both its gas resources and coal plants—based on the marginal cost to operate each. This evaluation is to ensure TEP is utilizing its resources to best serve ratepayers. Unlike gas resources, which expose ratepayers to fuel price volatility risks and further risk stranded asset costs associated with these new natural gas resources,[16] new renewables resources and battery storage alternatives that come with zero fuel costs have continually declining capital costs. TEP should focus on reducing the generation output from its fossil resources—and thus the emissions—associated with these fossil resources whenever economically possible and should continually evaluate whether its baseline operational assumptions remain valid. At its coal plants specifically, TEP should focus on evaluating the option to lower the minimum operating levels of any units, to move up or stagger any retirement dates, and to mothball for a period of time any of its units as markets shift.

To that end, we recommend TEP continue to evaluate the economics of operating its fossil fuel resources such that it balances serving its customers in a cost-effective manner while also working towards lowering its emissions and planning for a just and equitable transition for local communities.

5. Retirement analysis for existing fossil resources needs to be improved and refined

While TEP considered a wide range of portfolios and scenarios as part of its IRP process, it critically did not use optimized capacity expansion modeling to evaluate the optimal dates to retire Springerville and to exit Four Corners. Further, the IRP cites TEP's status as a minority owner at Four Corners to justify its failure to evaluate or consider exiting its agreement at the plant. In addition, TEP uses the need to develop a community-driven transition plan to justify pushing off consideration of retirement for over a decade. Finally, the Company fails to conduct any meaningful analysis on the economics of continuing to rely on its existing gas resources, notably its older Combustion Turbine (CT) units.

No optimized capacity expansion modeling

As with its 2017 IRP,[17] TEP did not rely on optimized capacity expansion modeling to evaluate retirement dates for its coal plants. Instead, TEP hard-coded dates into its model and then tested a series of retirement scenarios and dates for its coal plants. TEP's IRP states that while the

[16] A "stranded asset" is an asset that, at some point prior to its economic life, will no longer be able to earn an economic return. This can result from external or internal factors that impact the competitiveness or economics of the asset, or ability of the asset to legally operate within the current regulatory environment.
[17] Sierra Club Comments on TEP's 2017 IRP at 3, Docket No. E-00000V-15-0094 (Ariz. Corp. Comm'n Sept. 27, 2017), *available at* https://docket.images.azcc.gov/0000182930.pdf.

Company did conduct capacity expansion modeling to provide guidance throughout its portfolio creation and selection process, the modeling is not the basis for the retirement decisions.[18] We appreciate the number of scenarios and retirement dates that TEP tested, including some recommended by Sierra Club; however, we stress the importance of capacity expansion modeling to identify the optimal retirement dates for its coal fleet on a unit-by-unit basis.

Optimized capacity expansion modeling takes a specific set of parameters, constraints, and input assumptions and evaluates (1) what resources the system chooses to build/retire and when; (2) how (roughly) the system will choose to operate the selected set of resources; (3) how much it will cost to build and operate this system; and (4) what the emissions impact of operating the system will be. Production cost modeling, which is what TEP relies on instead, begins with a set portfolio of resources and focuses on a more granular evaluation of (1) how the system operates; (2) the cost to operate the system; and (3) the emissions impact of operating the system. The model as used by TEP does not include economically driven resource addition and retirement paths. Critically, the model relies on subjective retirement date assumptions for Springerville and Four Corners, and it does not allow for a model-driven solution to determine the most economic retirement dates. This introduces unnecessary economic inefficiency into the modeling process.

We recognize TEP will not produce a more accurate and robust IRP just by plugging its system data into capacity expansion software. As with any modeling tool, the quality and accuracy of the results depends on how well the model is parameterized and calibrated, and the accuracy and robustness of the inputs assumptions and constraints. But in robust IRP exercises, the company first conducts capacity expansion modeling runs and then takes the resource-build results and conducts a production cost run to get more granular operational results.

Optimized capacity expansion modeling takes the seemingly endless combinations of resource-build and retirement decisions (based on the number of new resources available, the number of existing resources that can be retired, and the number of years over which all build and retirement decisions can be made) and evaluates all possible resource-build and retirement decisions relative to all others based on capital and operational cost until it finds the least-cost option that fits within the modeled constraints. This allows the modeler to evaluate a variety of dynamics that are much harder to capture in production cost modeling, including: (1) the timing of a resource-build or retirement decision; (2) how one resource-build or retirement decision drives or impacts another resource-build or retirement decision; (3) how market prices are impacted by resource-build and retirement decisions and vice versa; and (4) how resource-build decisions are impacted by fuel price and capital cost trajectories.

While TEP modeled a large number of scenarios based on stakeholder feedback, a more robust approach would involve modeling both utility-driven scenarios and stakeholder-driven scenarios in capacity expansion mode. *We therefore recommend that the Commission require TEP to*

[18] This was stated in a call that TEP had with Sierra Club and Synapse.

conduct a series of optimized capacity expansion modeling runs to determine the optimal retirement date for Springerville and the optimal date to exit the Four Corners plant, this will help the Company to better understand how various inputs and parameters influence the optimal date of retirement for its coal plants.

No evaluation of the risk of future coal supply limitations based on regional coal plant closures

While coal price volatility and availability is not typically a central modeling sensitivity, at Springerville, TEP acknowledges that the planned closure of other coal plants in the region has increased the risk of regional coal mine closures that could limit the availability of fuel for some of its coal units.[19] Given this explicit acknowledgement, TEP's IRP should be robust against any future risk and uncertainty related to its coal supply. Specifically, *TEP should conduct and regularly update break-even analysis model runs to test the price at which the marginal cost to operate Springerville surpasses the cost of alternatives such as new renewable and battery storage resources.* If the Company's coal supply becomes limited or more expensive at some point in the future, the Company will already have a baseline understanding of how to respond.

Reliance on Four Corners joint-ownership structure to avoid evaluation of economic exit or retirement date

Four Corners is jointly owned by TEP, Salt River Project, Public Service Company of New Mexico (PNM), and Arizona Public Service (APS).[20] Joint-ownership arrangements make operational and retirement decisions trickier than with a single plant owner, but the complication or challenge added by this structure in no way changes the utility's obligation to protect its ratepayers. Specifically, if a joint-ownership agreement forces a company to keep a unit online or operate a unit in a manner that does not best serve its ratepayers, the Company has an obligation to its ratepayers to evaluate alternatives to staying in that arrangement.

When evaluating the economics of retiring Four Corners, it is essential for TEP to focus on its obligation to provide electricity at low cost to its ratepayers by maintaining a cost-effective portfolio of resources. TEP should not assume by default that staying in the co-ownership structure provides the most cost-effective electricity to its ratepayers. Similarly, TEP should not assume that continuing to participate in Four Corners is the most cost-effective way to address the coal-supply contract for Four Corners. *TEP should model the full costs associated with a decision to exit the plant and replace any gaps with new resources to determine whether it is in the best interest of its customers to remain a co-owner of Four Corners or to exit the agreement and pay out its share of the long-term coal contract.*

[19] TEP 2020 IRP at 15.
[20] *Id.* at 95.

Reliance on the Community-Driven Transition Plan as an excuse to delay consideration of plant retirements

TEP's decision to close or exit its coal plants should factor in the timeline for developing a community-driven transition plan for the communities impacted by the plant and mine closures. TEP acknowledges this fact and asserts the need for sufficient time to develop such a plan, stating:

> A significant factor in the closure dates selected for these units relates to the time needed to develop and implement a community-driven transition plan to mitigate the impacts of closing down these facilities. TEP will engage its employees, community leaders and other key stakeholders as it begins to develop a transition that will focus on addressing the needs of our employees and assisting the community in economic development activities.[21]

While we fully support the development of a community-driven transition plan to support the workers and communities who will be impacted by these closures, using the development of such a plan as an excuse to push out retirements until 2027 for Springerville Unit 1 and until 2032 for Unit 2 is unreasonable. Given the strong indication that coal will not remain economically competitive into the future, TEP should begin, now, the process of developing a robust and flexible transition plan.

Therefore, in addition to our recommendation that the Commission require TEP to allow its model to determine the optimal date of retirement for its coal plants, *we further recommend that it (a) provide an explanation for the ways in which the development and implementation of a community-driven transition plan impacts the selection of the coal plant retirement dates, and (b) begin its community-driven transition plan immediately, such that it does not require delaying the optimal retirement of uneconomic and unnecessary coal plants.* Notably, we recommend TEP act on its own responsibility for supporting community transition by beginning this process immediately rather than idly waiting for other utilities to take the lead, including and especially at Four Corners.

No evaluation of the economics of operating versus retiring the Company's existing CT plants

TEP does not evaluate the economics of continuing to operate the Company's existing CT plants relative to alternative resources as part of its IRP. Specifically, the Company has seven CT units totaling 219 MW. Two of these units were built in 2001 and have no scheduled retirement dates, and the other five CT units were built between 1972 and 1973 and are scheduled to retire in

[21] *Id.*at 18.

2027. TEP acknowledges that these retirement dates are set based on each plant's current depreciation schedule[22] and not based on economic retirement analysis.

The Company also asserts that certain gas-fired units provide reliability services. Specifically, the Sundt unit provides black-start capability to the Bulk Electric System that would need to be replaced before those units could retire. But that is not a reason to ignore modeling the resources and evaluating the economics of alternatives. Indeed, it is reason to focus on improving its understanding of the most cost-effective way to provide the system the services it needs. It may be optimal to replace those reliability services in the near- or mid-term and retire the gas-fired units. Without an optimized capacity expansion model run, we are unable to identify the most optimal path for the retirement of these units. *Therefore, as with its coal plants, we recommend that the Commission require TEP to allow its model to determine the optimal date of retirement for each gas-fired unit, and to incorporate economic and reliability parameters into the model's optimization.*

6. TEP should study EIM market integration and incorporate it into future resource planning modeling

In May 2019, TEP signed an agreement to join the CAISO Western EIM beginning in April 2022. The EIM is a specialized wholesale power market system that seeks to identify low-cost energy to serve real-time consumer demand in the West. It further seeks to improve the integration of renewable energy within the market's western footprint by balancing the sub-hourly intermittent characteristics of wind and solar power.[23] While the EIM market does not provide capacity or firm resources, it does critically aggregate the variability of loads and resource outputs across the footprint of its participating balancing areas when deciding how to dispatch resources to achieve the least-cost balance of electric demand and supply in real time.

By entering the EIM, TEP expects to realize at least three benefits:

1. "[E]conomic savings to customers through lower production costs;"
2. "Improve[d] visibility and situational awareness for system operations in the Western Interconnection;"
3. "Improve[d] integration of renewable resources."[24]

TEP's entrance into EIM impacts its existing resources and has the potential to reduce generation (and thereby emissions) from its current fossil units. In November 2018, TEP received a completed analysis from is consultant E3 which estimated $13.6 million in annual benefits from EIM market participation.

[22] *Id.*at 99.
[23] *See* Western Energy Imbalance Market, *About*, https://www.westerneim.com/Pages/About/default.aspx (last visited Oct. 9, 2020).
[24] TEP 2020 IRP at 109.

While the Company's decision to join the EIM is generally positive and desirable if implemented correctly, the timing is concerning. Despite its contractual plans to enter CAISO's Western EIM within the short-term action window of its 2020 IRP, TEP does not include its planned market integration into its IRP.[25] It further acknowledges that it is "still working through what changes if any may be needed to capacity hedging procedures" within its models.[26] While we acknowledge the difficulty involved in incorporating EIM participation into IRP modeling, it is essential that TEP study the impact of EIM market integration on the operation of its resources. *We therefore recommend that the Commission require TEP to work towards the development of a methodology for modeling EIM market integration in advance of its next IRP.* TEP should commit to developing a plan for modeling EIM market integration, including milestones and goals, to demonstrate in good faith that it is actively exploring this topic.

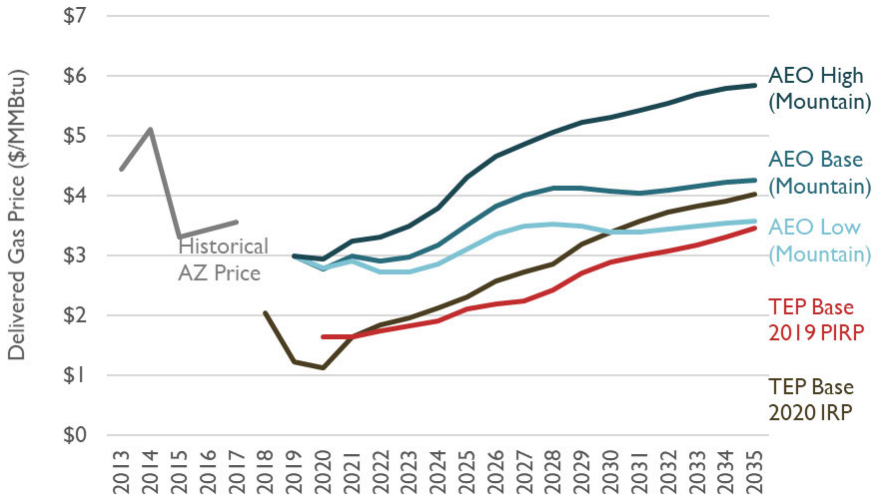
7. Natural gas prices are too low

Gas price projections are a key driver of resource economics and the choice of optimal generation and capacity mix, as well as the optimal retirement dates for TEP's gas-fired power plants. Lower gas price assumptions make gas-fired resources appear more economic relative to alternatives (and vice versa). It is therefore critical to ensure the gas price projection is reasonable and aligned with industry-standard projections. We find that TEP's base case gas price forecast for Arizona delivery continues to be low relative to other leading industry sources.

Although TEP's base forecast is slightly higher than the forecast it included in its Preliminary IRP, the base case gas price forecast continues to be well below the EIA AEO's regional projections of delivered gas prices for the electric sector (Figure 1).[27] TEP's forecasted gas prices from the Permian Basis are below $2 per MMBtu until 2023, and then stay below $3 per MMBtu through to the end of the 2020s.[28] We acknowledge that TEP uses a higher gas price forecast as a sensitivity, but we are concerned that the Company's reliance on a low gas forecast as the baseline for most of its scenario systematically favors continued reliance on gas resources.

[25] This was acknowledged in TEP's response to a question submitted by Sierra Club and Synapse.
[26] This was acknowledged in TEP's response to a question submitted by Sierra Club and Synapse.
[27] TEP 2020 IRP at 131; TEP 2019 Preliminary IRP at 46, Docket No. E-00000V-19-0034 (July 1, 2019), *available at* https://docket.images.azcc.gov/E000001561.pdf; U.S. Energy Info Admin. *Annual Energy Outlook 2020: Table 63. Natural Gas Delivered Prices by End-Use Sector and Census Division* (Jan. 2020), *available at* https://www.eia.gov/outlooks/aeo/data/browser/#/?id=78-AEO2020&cases=ref2020&sourcekey=0.
[28] TEP 2020 IRP at 131.

Figure 1: 2020 TEP delivered gas price forecast vs EIA historical and projected



We are also concerned with the methodology that TEP utilized to develop its base case gas price projection. TEP relies on near-term natural gas prices from the Intercontinental Exchange index for 2020 and 2021. It then extrapolates through the remaining study period by applying the growth rates of Wood Mackenzie's Henry Hub gas prices.[29] While this methodology is not necessarily incorrect, it differs from the methodology used in other industry papers. For example, the *2018 Avoided Energy Supply Components in New England* report relies on NYMEX prices for two years of near-term prices before shifting to an average of NYMEX and AEO prices for the third year. It then relies fully on the AEO forecast beginning in the fourth year.[30]

The methodology utilized by TEP systematically favors gas resources. By relying only on the growth rates of Wood Mackenzie's Henry Hub gas prices, rather than the gas prices themselves, TEP is extrapolating an unreasonably low near-term gas price through the study period, rather than shifting up to higher longer-term gas price projections. *We therefore recommend that the Commission require TEP to reevaluate its natural gas price projection such that it relies on long-term natural gas prices from Wood Mackenzie (or AEO), rather than using only the growth rate from Wood Mackenzie's long-term natural gas price projection to extrapolate lower near-term gas prices through the study period. TEP should refile its IRP with updated sensitives that rely on an update gas forecast.*

[29] *Id.* at 129.
[30] Synapse Energy Economics, et al., *Avoided Energy Supply Components in New England: 2018 Report* at 24 (Mar. 30, 2018), *available at* https://www.synapse-energy.com/sites/default/files/AESC-2018-17-080.pdf.

8. TEP should study the impacts of EVs on load and peak and better integrate them into future load forecasts

As the penetration of EVs increases across the United States, utilities are facing the challenge of modeling the expected future load that these vehicles will have on their systems. TEP expects that incremental growth in EV use will increase the annual load growth rate from 0.8 percent to 1.3 percent in the 2020 to 2035 period.[31] TEP stated that EVs connected to the Company's grid currently contribute more to peak than to average daily load, but the Company is modeling future EV load as flat, implying the load will be better managed in the future than it is currently. This means TEP is implicitly assuming that EVs will add considerably less peak load than that suggested by current EV charging behavior, despite no clearly outlined strategies to achieve that outcome.

It is reasonable, and perhaps even desirable in this early stage, for TEP to model EVs as a flat load adder. If the Company instead assumes that all new EV load would be added with a high peak impact that could drive the need for additional (unnecessary and expensive) peaking capacity. But, as more EVs are added to system, TEP will have to learn how to manage the load in real time through, time-of-use rates, "vehicle-to-grid" technology where the car battery can be used both to store electricity and to discharge to the grid, and potentially other tools and resources.

The Company should study how the additional load from EVs will impact the system, and what programs, technologies or rates can most cost-effectively mitigate the impacts from that additional EV load. This is critical because, if left unmanaged, EV load could drive unnecessarily high levels of peak demand on TEP's system and therefore require unnecessary and new resources to meet the EV load.

We therefore recommend that the Commission require TEP to study and incorporate the impact of technologies like vehicle-to-grid on system peak as well as the ability of those technologies to alter the impact of EVs on peak load. We further recommend that the Commission require TEP to explore, refine, and document its assumptions about the ability of rate design, such as TOU rates, to mitigate the peak impact of EVs in future proceedings.

9. Conclusion and Recommendations

TEP's 2020 IRP shows that the Company is committing to building only renewable resources, battery storage, and energy efficiency as it retires its existing fleet of fossil fuel resources. While we appreciate the effort that TEP put into developing a suite of initial modeling runs, soliciting stakeholder feedback on its modeling runs, and in the determination of its final IRP portfolio, we

[31] TEP 2020 IRP at 21.

are concerned about several of its underlying assumptions and modeling practices. We recommend that IRP be conditionally approved, consistent with the following:

- TEP should submit a revised IRP that:
    - Tests a natural gas forecast based on Wood Mackenzie's long-term natural gas price projections, rather than the current low forecast that relies only on the growth rates of Wood Mackenzie's long-term natural gas price projections;
    - Tests the costs or savings from imposing more aggressive emissions reductions targets to reduce reliance on generation from fossil resources (concurrently with the natural gas price forecast modifications); and
    - Incorporates the impacts of COVID-19 on near-term load growth projections.
- TEP should develop a plan to incorporate entry into EIM into its resource planning modeling.
- TEP should conduct a detailed study of the economics of continuing to operate Springerville and Four Corners based on:
    - Optimized capacity expansion software to evaluate the optimal retirement dates for its coal plants and the least-cost replacement resources; and
    - Evaluation of the impact on market prices of coal plant retirements, and the resulting impact on renewable resource economics.
- TEP should study the impacts of EV load on peak demand and energy; specifically, the Company should:
    - Continue to refine its understanding of, and projection around, its own future EV load;
    - Evaluate how EV load can be incorporated with TOU pricing or other mechanisms that can reduce peak impacts from EV load; and
    - Evaluate the impact of Vehicle-to-Grid technologies.