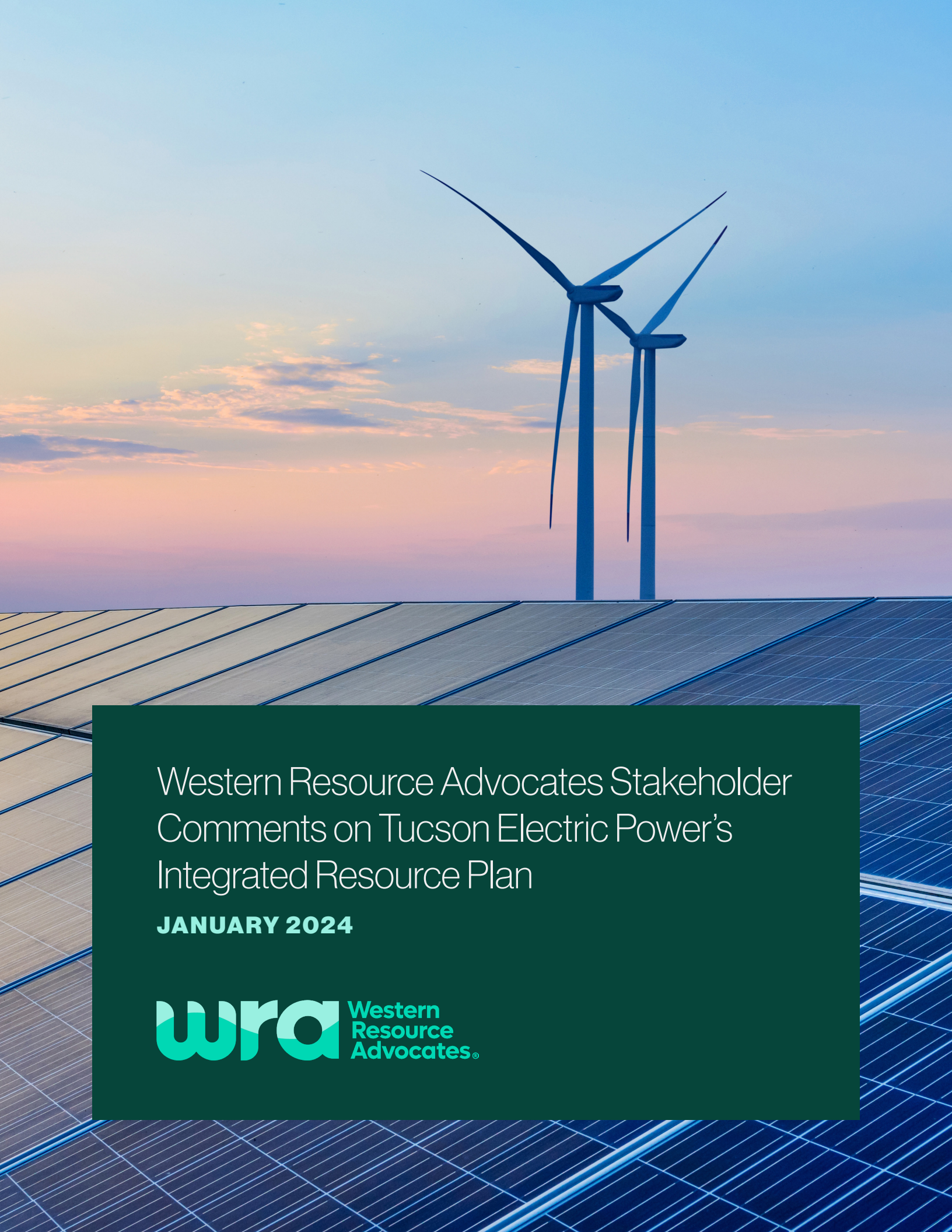

Western Resource Advocates Stakeholder Comments on Tucson Electric Power's Integrated Resource Plan

JANUARY 2024

Western Resource Advocates®

WRA's Stakeholder Comments on Tucson Electric Power's Integrated Resource Plan

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I. Introduction

Western Resource Advocates ("WRA") submits the following comments on the 2023 Integrated Resource Plan ("IRP") of Tucson Electric Power ("TEP"). WRA is a non-profit, public-interest conservation organization dedicated to protecting the land, air, and water of the West. WRA helps to develop and implement policies to reduce the environmental impacts of the electric power industry in the region. WRA participated in TEP's Resource Planning Advisory Council ("RPAC") and Modeling Committee. During this process WRA has worked closely with independent consulting firms GridLab and Energy Strategies to develop a deeper understanding of TEP's future resource opportunities. WRA has substantial experience in the IRP process after participating in years of IRPs, both in Arizona and in other Western states. WRA supports the acknowledgement of TEP's IRP but recommends that in its May 31, 2024, Response to Stakeholder Comments, TEP address deficiencies in its modeling, including the lack of long-term capacity expansion modeling and a failure to model portfolios as required by Decision No. 78499.

II. Background

A. Integrated Resource Planning

An Integrated Resource Plan is a tool for utilities and regulators to determine which mix of supply-side and demand-side resources will meet energy demand while keeping costs low, mitigating risk, and achieving policy goals.[1] The IRP process requires utilities to use analytical tools that should fairly evaluate and compare the costs and benefits of different kinds of resources.[2] This analysis goes beyond considering supply-side options.[3] Integrated Resource Planning presents an opportunity for utilities in Arizona to demonstrate to the Arizona Corporation Commission ("Commission") that Arizona's families and businesses will have affordable, reliable, and sustainable energy for the next 15 years.

IRPs are most effective when they are comprehensive, aligned, trusted, and impactful.

- **Comprehensive:** An IRP should accurately model the full suite of costs, system impacts, capabilities, and value of resources, and should consider these factors across transmission and distribution systems.[4]

[1] Mark Dyson et al., *Reimagining Resource Planning*, ROCKY MOUNTAIN INSTITUTE, 7 (2023), https://rmi.org/insight/reimagining-resource-planning.
[2] David Millar et al., *Redacted Revised Report Arizona Utility Integrated Resource Plan Review*, ASCEND ANALYTICS, 25 (2021), https://docket.images.azcc.gov/E000015107.pdf?i=1706030435502.
[3] *Id.*
[4] Dyson, *supra* note 1, at 8.

- **Aligned:** To be effective, an IRP should meet traditional planning requirements including affordability, safety, and reliability.[5]
- **Trusted:** The resource planning process works best when it is transparent, well vetted, and includes robust and diverse stakeholder input.[6]
- **Impactful:** An IRP should elicit Commission review and approvals of specific resource-related decisions based on competitive solicitations that are informed by the approved IRP modeling. All subsequent resource-related decisions should be consistent with the prior approved IRP.

Without these qualities the accuracy, credibility, and effectiveness of any IRP may be eroded, which in turn can cause unanticipated costs to rate payers, imprudent investments, and public policy failures.[7]

Comprehensive utility planning – like the IRP process – is more important than ever and provides utilities an opportunity to cost-effectively navigate the constantly evolving energy landscape in Arizona. This is especially salient for TEP, given that the utility plans to reduce carbon emissions 80% by 2035, develop 2,640 megawatts ("MW") of new generating capacity overall, and develop 1,330 MW of new energy storage over the next 15 years.[8] As TEP looks forward to how it will serve Arizonans over the next decades, it is incumbent upon the utility – and the Commission – to fairly evaluate renewable energy and storage resources, minimize the risks to customers associated with fuel price volatility, plan for the impact of regional market expansion in the West, and build a sustainable system that protects the health and pocketbooks of Arizonans.

This proceeding represents an important opportunity to shape Arizona's energy future.

B. Integrated Resource Planning in Arizona

The Commission adopted its first Resource Planning and Procurement Rules in 1989, and the rules were subsequently updated in 2010.[9] Arizona Administrative Code, Title 14, Chapter 2, Article 7 contains a variety of obligations for utilities engaged in resource planning, such as utilizing a 15-year planning period; filing updated IRPs every even number year; disclosing potential renewable resources, energy efficiency considerations and environmental concerns; and offering opportunities for public input. Following the review of

[5] *Id.*
[6] *Id.*
[7] *Id.* at 9.
[8] Victor Aguirre et al., *Tucson Electric Power 2023 Integrated Resource Plan*, TUCSON ELECTRIC POWER, 2 (2023) https://docs.tep.com/wp-content/uploads/2023-TEP-IRP.pdf.
[9] Decision No. 71722; Arizona Administrative Code Title 14, Chapter 2, Article 7, Resource Planning.

each utility's IRP, the Commission is then required to file an order that either acknowledges the IRP, modifies the IRP, or states the reason for denying the IRP.[10]

In deciding whether an IRP should be acknowledged, the Commissioners are directed by A.A.C. R14-2-704(B) to consider the following factors:

1. The total cost of electric energy services;
2. The degree to which the factors that affect demand, including demand management, have been taken into account;
3. The degree to which supply alternatives, such as self-generation, have been taken into account;
4. Uncertainty in demand and supply analyses, forecasts, and plans, and whether plans are sufficiently flexible to enable the load-serving entity to respond to unforeseen changes in supply and demand factors;
5. The reliability of power supplies, including fuel diversity and non-cost considerations;
6. The reliability of the transmission grid;
7. The environmental impacts of resource choices and alternatives;
8. The degree to which the load-serving entity considered all relevant resources, risks, and uncertainties;
9. The degree to which the load-serving entity's plan for future resources is in the best interest of its customers;
10. The best combination of expected costs and associated risks for the load-serving entity and its customers; and
11. The degree to which the load-serving entity's resource plan allows for coordinated efforts with other load-serving entities.

TEP's previous IRP was acknowledged by the Commission in Decision No. 78499. In that decision, the Commission also established several requirements for future resource plans.[11] These requirements include:

1. **Presenting information about the broader environmental impacts of power production.** Specifically, the Commission ordered that utilities "include sufficient information in future Integrated Resource Plans regarding environmental considerations, as required by the Resource Planning and Procurement Rules."[12]

[10] A.A.C. R14-2-704(B).
[11] Docket E-00000V-19-0034, https://edocket.azcc.gov/search/docket-search/item-detail/22167.
[12] Decision No. 78499, at 6, 12, https://docket.images.azcc.gov/0000206081.pdf?i=1706035978708.

A.A.C. R14-2-703(D)(I7) of the Integrated Resource Planning and Procurement Rules requires utilities to present information about "societal costs of carbon emissions and water consumption" in its portfolio analysis.

2. **Analyzing a minimum of 10 resource portfolios "that are designed to evaluate the range of resource procurement actions, and their respective costs and benefits, that can be taken to achieve the emissions reduction goals specified" in TEP's 2020 IRP.**[13] The Commission went on to identify specific portfolios it wanted to be presented, such as a portfolio that removes restrictions on energy efficiency, and a portfolio that removed modeling restrictions on the economic cycling and economic retirement of coal units.[14]

3. **Presenting "robust retirement analyses[,] including specific estimated retirement dates for each resource."**[15] More specifically, the Commission directed TEP to file "a comprehensive early retirement analysis for Springerville Generation Station Units 1 and 2 and of its stake in Four Corners Power Plant."[16] This analysis must include an evaluation of the economic costs and benefits to customers from the retirement, possible necessary replacement of energy and capacity, and impacts to electric reliability.[17]

4. **Utilizing capacity expansion modeling in future Integrated Resource Plans.**[18] The Commission adopted certain recommendations from Ascend Analytics, including a recognition that best practices in resource planning include utilization of capacity expansion models optimized to select the most economic resources that are subject to defined constraints,[19] as well as a consideration of sub-hourly attributes of flexible resources in analyzing costs and benefits to the energy system.[20]

5. **Providing modelling software licenses to up to 12 RPAC members, thereby enabling those organizations to perform their own modeling runs.**[21] Through this requirement, the Commission recognized the broader process benefits when stakeholders have the tools to provide alternative perspectives on how to meet reliability, emission reductions, and affordability objectives. This improved transparency and reduction in information asymmetry can assist regulators and stakeholders in making fully informed resource decisions. Stakeholder portfolios can

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[13] Decision No. 78499, at 13.
[14] *Id.* at 14.
[15] *Id.* at 12.
[16] *Id.*
[17] *Id.* at 11-12.
[18] *Id.* at 17.
[19] David Miller, et al., Ascend Analytics Redacted Revised Report, Ascend Analytics (2021), at 50.
[20] *Id.*
[21] Decision No. 78499, at 14.

provide options not previously considered by utilities and can challenge the assumptions inherent in a utility's portfolios.

Commission Decision No. 78499, which was approved by Commissioner Lea Marquez Peterson, Commissioner Anna Tovar, and Chairperson Jim O'Connor, established a more robust IRP procedure for utilities to follow in Arizona. The Commission should build upon the improvements established in this decision, and further refine the IRP process using lessons learned from this IRP cycle. By doing this, the Commission can help to ensure that IRPs in Arizona are comprehensive, aligned, trusted, and impactful. This, in turn, will directly benefit utilities, stakeholders and, most importantly, Arizona's ratepayers.

C. TEP's Stakeholder Engagement and the Resource Planning Advisory Committee

The Commission should recognize the importance of stakeholders in the IRP process and continue to require robust stakeholder engagement, including access to modeling software, in future IRP cycles. To its credit, TEP recognizes the need for stakeholder input in light of the complexity of the shifting energy landscape.[22] The stakeholder process established by the Commission in 2021 has definitively improved the IRP process in Arizona. TEP's Resource Planning Advisory Council ("RPAC") first convened in October 2022. Participants included Western Resource Advocates, Pima County, the Residential Utility Consumer Office, General Motors, and Davis-Monthan Air Force Base,[23] representing a broad range of perspectives.

However, due to delays and insufficient data sharing, the TEP stakeholder modeling efforts were not as impactful as they could have been. Therefore, WRA recommends a series of improvements to this process, which will be discussed in more detail below.

III. Comments and Recommendations

TEP filed its Integrated Resource Plan on November 1, 2023. TEP's IRP outlines how it will realize its vision for the next 15 years and addresses some of the opportunities and the challenges it will face during that period. WRA applauds TEP for its ambition in tackling some of the most pressing issues facing Arizona's utilities today. TEP has committed to continuing seasonal operations at Springerville Generating Station.[24] TEP's filing emphasizes the need for a balanced portfolio that relies upon solar, wind and storage resources, and has committed to evaluating new projects that are eligible for funding under the Inflation Reduction Act and Bipartisan Infrastructure Law.[25] Acknowledging the importance of the expanding regional

[22] Aguirre, *supra* note 8, at 26.
[23] *Id.*
[24] Aguirre, *supra* note 8, at 9.
[25] *Id.* at 12, 22.

markets in the West, TEP's IRP discusses its continued participation in the development of these markets and lists which factors it will weigh in evaluating which market it will join.[26] Most importantly, TEP has committed to reducing its carbon dioxide (CO_2) emissions at least 80% by 2035,[27] as well achieving a 95% reduction in nitrogen oxide (NO_x) emissions and an 81% reduction in water usage.[28]

WRA recommends the Commission acknowledge TEP's IRP. However, there are significant areas for improvement in TEP's resource planning process. In order to ensure TEP's IRP and subsequent resource acquisitions meet the needs of Arizonans, WRA recommends certain amendments to its plan, which could be submitted as part of TEP's Response to Stakeholder Comments, which is due May 31, 2024.

First, in its May Response filing, TEP should present portfolios using long-term capacity expansion ("LTCE") modeling. In particular, TEP should include a benchmark LTCE portfolio that can be used as a reference case. This benchmark portfolio should be developed using unconstrained long-term capacity expansion modeling. Second, TEP should include a comprehensive early retirement analysis for Springerville Units 1 and 2 as well as Four Corners Units 4 and 5, as required in Decision No. 78499. Third, TEP should commit to accelerating its procurement of "no-regrets" wind, solar, and storage resources that provide low-cost energy and system benefits, and which the modeling selected in portfolios satisfying reliability and cost metrics. Fourth, TEP should present an analysis explaining whether the results of long-term capacity expansion modeling sufficiently justify TEP's proposed 400 MW of new methane gas generation. Fifth, TEP should further refine its preferred portfolio by including market participation assumptions.

In addition, WRA provides suggestions for the Commission as it looks forward to future IRP cycles. First, the Commission should continue to direct TEP to engage in a robust stakeholder process but provide additional specificity and direction to ensure that process is impactful and meaningful. Second, the Commission should move away from concurrent IRP filings for all regulated utilities in Arizona, whose IRPs are currently filed and evaluated in the same timeframe. This will allow a more thorough evaluation of each utility's proposed plan.

A. Suggested Amendments to TEP's Plan

TEP provided 10 hand-crafted portfolios in its IRP filing, which cover a wide range of portfolios. TEP describes its preferred portfolio – P02 – as a "balanced portfolio" that achieves significant reductions in carbon dioxide emissions. Because the portfolios provided by TEP are all hand-crafted, it is difficult to validate whether these portfolios are optimal build decisions for the utility or its customers. TEP failed to adhere to certain directives in Commission

[26] *Id.* at 22-25.
[27] As compared to a 2005 baseline.
[28] *Id.* at 15.

Decision No. 78499 and should remediate these errors in its May Response to Stakeholder Comments.

1. TEP Should Present Portfolios Developed Through Long-Term Capacity Expansion Modeling

Commission Decision No. 78499 directed TEP to "leverage optimized capacity expansion algorithms combined with 'hand designed' portfolios and sensitivities."[29] However, TEP provided *only* "hand designed" portfolios and failed to provide a portfolio developed solely through the long-term capacity expansion portfolio – without any "hardcoded" resources. In particular, the set of portfolios provided lacked an LTCE benchmark case against which other portfolios could be assessed. Benchmark portfolios are important because they are used to validate or confirm the assertions established in TEP's IRP.

Due to the failure to include a benchmark portfolio, WRA and its independent modeler, Energy Strategies, were forced to expend a great deal of time and effort attempting to reconstruct TEP's benchmark long-term capacity expansion data. This not only was a significant strain on WRA's resources, but it also prohibited WRA from being able to robustly contribute to this IRP process in the short timeframe since receiving TEP's modeling data.

TEP first provided stakeholders with its Aurora modeling on June 28, 2023. However, the data was incomplete. This data included short-term dispatch models, simulation settings, and some of the supporting inputs necessary to conduct analysis. TEP's supporting inputs are organized in tables (i.e., loads, fuel prices, emissions constraints, existing resources, new or candidate resources, and other inputs). This June 28, 2023, submission from TEP lacked both a long-term capacity expansion portfolio and a "New Resources" table. A "New Resources" table in Aurora defines the candidate resources from which the model can elect to build new generation resources through an LTCE optimization. Without the specification of generic "New Resources" from TEP, the data provided was inadequate for stakeholders to evaluate.

Approximately five and a half months later, on November 13, 2023, TEP delivered its second Aurora model to stakeholders. This second deliverable included TEP's zonal dispatch models, sensitivity portfolios, and select LTCE models. These LTCE models did not align with the portfolio described in TEP's IRP as submitted to the Commission. Further, each of the LTCE models in this second set included hardcoded, hand-selected resources. As a result, neither data set included a reference case for benchmarking. Thus, in its May Response filing, TEP should apply unconstrained long-term capacity expansion modeling to construct and present a benchmark portfolio that can be used as a reference case.

The zonal dispatch models, on the other hand, included the 10 portfolios discussed in TEP's filed IRP. Zonal dispatch models cover a shorter timeframe and are most often used to

[29] Ascend Analytics, *Arizona Utility Integrated Resource Plan Review*, https://docket.images.azcc.gov/E000015107.pdf?i=1706030435502 at 11, adopted in Decision No. 78499, at 17.

test a portfolio's dispatch and operations on an hour-to-hour basis. These models are not suited to inform the planning of long-term capacity expansion needs under various future portfolios as is typically needed for integrated resource planning. Resource planning efforts are best informed by LTCE modeling, which empowers utilities to build "optimal" future resource portfolios given candidate resources, load growth expectations, and multi-year constraints. LTCE models offer a mathematically rigorous approach that can be reviewed empirically. While portfolios resulting from LTCE optimization merit additional scrutiny from resource planning experts, the comparison of various future portfolios under an optimized LTCE framework offer utilities an unbiased perspective to inform their resource planning efforts.

In short, TEP has not provided the Commission with an unbiased perspective of their resource planning efforts and, therefore, TEP should provide LTCE models of its IRP portfolios in its May Response filing.

2. TEP Should Include a Comprehensive Early Retirement Analysis for Springerville Units 1 and 2 as well as Four Corners Units 4 and 5

Decision No. 78499 states, "Tucson Electric Power Company shall file a comprehensive early retirement analysis for Springerville Generating Station Units 1 and 2 and of its stake in Four Corners Power Plant."[30] The Decision goes on to direct TEP to evaluate retirement dates of 2024, 2025, 2026, 2027, 2028, 2029, 2030, and 2031 for both facilities.[31] TEP has failed to comply with these directives from the Commission and must address this inadequacy in its May Response to Stakeholder Comments.

TEP's P03 and P04 portfolios are the only cases that evaluate retirement dates that are earlier than what TEP has already presented in prior IRPs.[32] In portfolio P03, TEP models retiring Springerville Unit 2 in 2027, along with retiring Unit 1 in 2027, as currently planned.[33] In portfolio P04, TEP models retiring both units in 2030, which is an earlier date for Unit 2, but a later date for Unit 1, which is currently scheduled to be retired in 2027. In all portfolios, TEP assumes Four Corners Units 4 and 5 will be retired in 2031. Only the P03 portfolio attempts to adequately capture the cost or benefit of Springerville Unit 2 retirement without confounding elements which may mask the benefits of retiring the unit early. This is plainly inadequate as it does not consider early retirement in a way that is clearly described in Decision No. 78499.[34] Each plant closure date should be modeled separately for each unit.

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[30] Decision No. 78499, at 12.
[31] *Id.*
[32] Aguirre, *supra* note 8, at 16 (showing that TEP announced existing closure dates [unit 1 2027, unit 2 2032] in the 2021 IRP Filing).
[33] *Id.* at 56.
[34] Decision No. 78499, at 12.

Notably, on January 24, 2024, just five business days before the due date for these Stakeholder Comments, TEP filed a supplement to its IRP, "Appendix N – Analysis of Additional Retirement Years for Springerville Generating Station (SGS) Units 1 and 2."[35] This three-page document presents cursory statements about TEP's evaluation of 2027, 2028, 2029, 2030, 2031, 2032, 2033, and 2034 as potential dates for simultaneous retirement of both Springerville Units.[36] Even with this supplemental information, TEP has still not complied with the requirements of Decision No. 78499. The supplemental information provides no additional analysis related to early retirement of the Four Corners facility, nor does it evaluate Springerville retirement in 2024, 2025, or 2026, as required by the Commission. Again, these unit closures need to be modeled independently and not include coal unit extensions along with the retirement portfolios. Having cases that retire all coal units early, in staggered years, may also be interesting to show the potential compounding value of coal closure, but modeling extensions and closures in the same portfolios only leads to results that are difficult to attribute.

WRA recommends that TEP fully comply with Decision No. 78499 and model the early retirement portfolios required therein, ideally using LTCE to easily compare these portfolios. Further, when modeling accelerated retirement dates, TEP should exclude the sunk costs associated with coal contracts and or other costs incurred after March 2, 2021. This, too, would be consistent with Decision No. 78499, which prohibits Arizona Public Service Company from including costs incurred from "coal contracts and operating agreement, termination liability or restrictions beyond those the company was subject to on March 3, 2021."[37] TEP should hold itself to this same limitation and not include the coal contract it signed in 2023 for Springerville Units 1 and 2 in the analysis TEP brings forward in its May Response to Stakeholder Comments.[38]

3. TEP Should Accelerate its Procurement of "No-Regrets" Wind, Solar, and Storage Resources

TEP has shown in every modeled IRP portfolio that the least-cost path to the future requires substantial investment in wind, solar, and storage resources. All portfolios modeled by TEP require solar, wind and storage generation acquisitions, while only the P02 preferred portfolio includes any new gas generation acquired during the planning period. Even TEP's early retirement portfolio for Springerville 1 and 2 (portfolios P03, P04 and P05) do not call for additional methane gas resource acquisitions through 2038.[39] These results indicate that investment in additional methane gas generation is likely unnecessary and may be an ill-advised expenditure for TEP's customers. In particular, the "Markets and Transmission

[35] TEP Supplemental Notice of Filing, https://docket.images.azcc.gov/E000033278.pdf.
[36] *Id.*
[37] Decision No. 78499, at 13.
[38] Aguirre, *supra* note 8, at 79.
[39] *Id.* at 52, Table 16, showing that all portfolios require no methane gas additions, except P02.

Reform" P10 portfolio, which was modeled with assumptions to capture the benefits of TEP's future day-ahead market participation, does not include new methane gas resources. If TEP joins a regional market in the next few years, investment in a new gas resource in 2028 may immediately be a stranded asset for the utility's customers, because the P10 portfolio has shown that new gas is unnecessary where regional markets create greater energy resource availability.

The clear "no-regrets" action plan for TEP is to conduct all-source solicitations and acquire solar, wind and storage resources early in the planning period. These are "no-regrets" resources for TEP, as they are the foundation of the future energy grid and will play an integral part in providing cost-effective generation for TEP's customers. Solar, wind, and storage generation are acquired as capital investments or through fixed-price power purchase contracts without the risk of volatile and increasing fuel costs. The modeling conducted by TEP for its IRP assumes hypothetical costs for generic resources, but TEP should continue to test the market for competitive pricing from real bids to identify low-cost solar, wind and storage resources that are demonstrated to perform well for all modeled portfolios. While large investments in new resources may seem counterintuitive as an argument for cost savings, TEP's modeling shows this accounting works.[40] To maintain a robust and low-cost energy system, TEP should not delay acquisitions of solar, wind and storage resources. Contrarily, it may be able to defer acquisition of gas generation.

TEP demonstrates the value of flexibility in its planning, enabling it to take advantage of opportunities to acquire "no-regrets" resources, by illustrating multiple short- and mid-term pathways to meeting its resource needs.[41] All of these pathways are best served by near-term acquisitions of "no-regrets" solar, wind and storage resources.

4. TEP Should Justify its Proposed 400 MW of New Methane Gas Generation Using Long-Term Capacity Expansion Modeling

The need to acquire additional gas generation is not adequately supported in TEP's IRP. No portfolio modeled by TEP shows a need to acquire additional methane gas generation in the planning period, other than portfolio P02, in which 400 MW of additional gas was hand-selected by TEP. Even the early coal retirement portfolios (P03, P04, and P05) do not show any acquisitions of new methane gas generation during the planning period.[42] In its May Response, TEP should provide better support for the proposed gas acquisitions. Further, TEP should implement its action plan with a flexible approach to test competitive solicitations for the availability of "no regrets" resources to delay or avoid the acquisition of additional gas generation, or early retirement of coal resources.

[40] *Id.*at 49, Figure 45.
[41] *Id.* at 51, Figure 51.
[42] *Id.* at 52, Table 16.

To improve its long-term capacity expansion modeling, TEP should update its Aurora modeling data and provide an unconstrained, LTCE portfolio, without hardcoded resources, in its response to stakeholder comments. TEP's IRP states that it "developed and evaluated 10 portfolios using two different but related modeling approaches: 1) iterations of hand-crafted portfolios and 2) long-term capacity expansion."[43] Based on the modeling data files and the lack of information in the IRP filing, it is unclear if an LTCE portfolio was used. It is important for TEP to supply this information to both the Commission and stakeholders to show why their proposed investments are in the best interest of ratepayers.

Additionally, when comparing TEP's modeling data with that received from APS, the TEP model is inadequate and lacks the depth and robustness found in the APS datasets. This is particularly the case in its definition of new resources. The data and models provided by TEP included very limited options for alternative resources that the model could select, which doesn't sufficiently represent the universe of options available in the marketplace. In reviewing the data provided, Energy Strategies identified that the operating characteristics of energy storage were not correctly specified in the model, and the portfolio costs could not be replicated using the data in that set. Due to these inadequacies, it is impossible to evaluate the veracity of the results. Therefore, TEP should revise its dataset, particularly its definition of new resources in its Aurora modeling and validate the costs of its preferred portfolio with least-cost LTCE modeling to justify its proposed methane gas generator acquisition.

5. TEP Should Further Refine its Preferred Portfolio by Including Market Participation Assumptions

TEP should include assumptions for market participation in its preferred portfolio (P02).

TEP's P10 portfolio "Market and Transmission Reform" is the lowest cost portfolio,[44] demonstrating substantial potential benefits of a regional market and transmission improvements, including savings for customers, incremental emissions reductions, and the opportunity to defer additional investment in methane combustion turbine generation in comparison to portfolio P02.

TEP discusses market participation considerations at length in its IRP filing.[45] It discusses various factors to weigh in comparing available market options and contemplates the many substantial benefits of regionalization.[46] TEP's P10 portfolio is specifically crafted to reflect these benefits to TEP's system. While WRA commends these efforts, we ask that TEP take it a step further. IRPs in Arizona are typically filed on a three-year cycle. Three years from now, it is likely that day-ahead market options will be available and TEP may potentially be

[43] *Id.* at 30.
[44] *Id.* at 52, Table 16, showing the modeled Net Present Value (NPV) of various portfolios.
[45] Aguirre, *supra* note 8, at 22-25.
[46] *Id.* at 24, summarizing benefits of regional electricity market participation.

enrolled in one of them. The IRP is meant to be a forward-looking plan to help the utility and regulators see a path into the future. TEP would best serve customers by including market assumptions in its preferred portfolio, given the demonstrated benefits of the P10 portfolio and TEP's explanation of the benefits of market participation in its IRP filing.

TEP did not include regional market assumptions in its preferred portfolio but should do so in its May Response filing. While TEP touts the cost savings of the P02 portfolio, it is not the least-cost portfolio provided. The P10 portfolio shows the considerable benefits available from market participation, and those benefits should be carried over to TEP's preferred portfolio. It is also important to note that TEP's P10 portfolio has the lowest fuel costs of all the portfolios, which contributes to minimizing the risk of fuel price volatility. It is clear that TEP should update the modeling results in its May Response filing to include market participation in its preferred portfolio.

B. Recommendations for Future IRP Cycles

1. The Commission Should Establish Specific and Clear Deadlines by Which Utilities are Required to Provide Data and Licensing to Stakeholders

For future IRP cycles, the Commission should again require that TEP engage in a robust stakeholder process, including a requirement to negotiate a project-based licensing fee to allow access to data and software tools, for the stakeholders who opt to participate. The value of the stakeholder process in this round of IRPs has been acknowledged by both TEP[47] and the stakeholder groups who dedicated their time, funds, and effort to participate in the RPAC and Modeling Committee. The Modeling Committee, which included two conservation organizations and a trade association, were provided a project-based limited license for the Aurora model and training on the software.[48] This process would have been even more valuable if TEP had timely delivered its materials and ensured those materials complied with prior Commission directives. Yet, even with its flaws, this collaborative process improved TEP's analysis and the transparency of this IRP. Commission Decision No. 78499[49] has also enabled stakeholders to provide valuable information to Staff and the Commission, which is demonstrated by these comments.

Decision No. 78499 was innovative in its approach to the IRP stakeholder process, but the Commission should refine that approach in its next decision to prevent unnecessary delays, and to ensure the full utilization of the modeling process when stakeholders are involved. The TEP stakeholder process was not without its flaws. For example, TEP did not fully comply with the requirements in Decision No. 78499 related to long-term capacity

[47] *Id.* at 26.
[48] Aguirre, *supra* note 8, at 27.
[49] Decision No. 78499, at 12.

expansion portfolios, and TEP had significant delays in its sharing of data which in turn created substantial barriers for its Modeling Committee.

Unfortunately, WRA faced considerable difficulty in fully utilizing the license which TEP provided for this IRP process. TEP sent out a non-disclosure agreement on May 4, 2023, but did not deliver its first model until June 28, 2023. This first model was incomplete and unable to support comparison of long-term capacity expansion portfolios as required by Decision No. 78499. This LTCE modeling is important for benchmarking and comparing various modeling portfolios by both TEP and Modeling Committee members.

Due to the notable delays in TEP's IRP process and the lack of information shared with stakeholder groups, WRA was supportive when TEP requested an extension of its filing deadline. On June 28, 2023, Decision No. 79017 moved the filing deadline for utilities from August 1, 2023, to November 1, 2023. However, this change did not fully elicit the progress that WRA was expecting.[50] TEP waited until November 13, 2023, to deliver its second set of modeling data to stakeholder groups. This second model, despite assurances from TEP, still did not have an LTCE model.[51] Without an unconstrained LTCE model provided by TEP, WRA's independent modeler was unable to properly compare and benchmark the various modeling portfolios against one another.

In its next decision the Commission should establish specific and clear deadlines by which utilities are required to provide modeling software licenses, and when utilities are required to share the data necessary to actually utilize the modeling software. Specifically, utilities should provide licensing agreements, preliminary utility data, and the training necessary to use that licensing to stakeholder groups at least six months in advance of the deadline to submit IRPs. Preliminary utility data should include inputs and assumptions available at that time, including for existing and generic resources, and should also include data that allows LTCE in a portfolio without hardcoded resource additions. The Commission should require that utilities provide all updated and finalized modeling data three months before the IRP filing deadline. A utility should ensure that stakeholders will be able to fully utilize software licenses, which requires having the license and data needed to utilize it well in advance of the IRP filing deadline.

2. The Commission Should Reform the IRP Process by Staggering the Years in which Resource Planning Occurs for Different Utilities

The Commission should stagger the IRP process for different utilities in Arizona. Integrated resource planning in Arizona is a process that spans the course of two years and includes multiple utilities undergoing similar processes but facing unique challenges, opportunities, and circumstances. Staggering the utility IRP deadlines provides more equitable

[50] Decision No. 79017, https://docket.images.azcc.gov/0000209385.pdf?i=1706722661995.
[51] *Id.* at 17.

opportunities for customers to participate in the process and enables thorough review by stakeholders and Commission Staff.

Requiring concurrent deadlines for all Arizona-regulated utilities, despite their differing circumstances, can unnecessarily complicate an already complex process. The current IRP process is made more difficult by combining multiple utilities into one process and administering a proceeding, with filings located in one docket. For example, individuals and businesses who are customers of only one utility but not another may be dissuaded from engaging in the IRP process because they are uncertain about how to engage with only their utility, when multiple utilities are included in a single docket. Evaluating a single utility's IRP within a separate docket would provide clarity for customers and a more meaningful opportunity to participate.

Arizona is not unique in handling all of its IRPs concurrently; however, other states in the West apply a more individualized approach. For example, in New Mexico, N.M. Admin. Code 17.7.3.8 mandates that IRPs occur on a staggered basis. New Mexico has three utilities, and so Public Service Company of New Mexico filed its IRP in 2023, Southwestern Public Service Company will file in 2024, and El Paso Electric Company will file in 2025.[52] This approach has a multitude of benefits, including less concentrated workload for Commission Staff, greater resources dedicated to utilities individually, clarity in the requirements for each utility, and flexibility in the Commission's approach to each IRP.

IV. Conclusion

WRA recommends TEP and the Commission undertake the following actions:

1. In its May Response to Stakeholder Comments, TEP should present portfolios developed with long-term capacity expansion modeling, and in particular, construct and present a benchmark portfolio as a reference case using unconstrained LTCE modeling.
2. TEP should accelerate its procurement of "no-regrets" wind, solar, and storage resources that provide low-cost energy and system benefits, and which the modeling selected in all portfolios satisfying reliability and cost metrics.
3. In its May Response to Stakeholder Comments, TEP should present an analysis explaining whether the long-term capacity expansion modeling sufficiently justifies TEP's proposed 400 MW of new methane gas generation.
4. In its May Response to Stakeholder Comments, TEP should further refine its preferred portfolio by including market participation assumptions.

[52] N.M. Admin. Code 17.7.3.8.

5. Particularly if the above information is provided, WRA recommends the Commission acknowledge TEP's IRP.
6. The Commission should recognize the value of informed stakeholders in the IRP process and continue to require the RPAC process for future IRP cycles.
7. The Commission should ensure the next IRP cycle avoids unnecessary delays and ensures full utilization of the modeling and stakeholder process. It can do so by establishing deadlines for when software licensing, input data and model portfolios are shared. Specifically, utilities should be required to provide licensing agreements and training with preliminary utility data at least six months in advance of the IRP filing deadline. Preliminary utility data should include inputs and assumptions available at that time, including for existing and generic resources, and should also include data that allows LTCE in a portfolio without hardcoded resource additions. The Commission should also require that utilities provide all updated and finalized modeling data three months before the IRP filing deadline.
8. The Commission should reform the IRP process by staggering the years in which resource planning occurs for different utilities to ensure the IRP review for each utility is a separate and distinct process.

RESPECTFULLY SUBMITTED this 31st day of January, 2024.

WESTERN RESOURCE ADVOCATES

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Appendix

To	Western Resource Advocates
From	Alex Palomino, Senior Consultant – Energy Strategies
Re	2023 Tucson Electric Power IRP Model – Technical Review
Date	January 26th, 2023

1. Scope & Background

By order of the Arizona Corporation Commission (ACC), Arizona investor-owned utilities made available the planning models employed in the development of their 2023 IRP filing. This memo provides an independent technical review of the Tucson Electric Power (TEP) Aurora Energy Forecasting Software (Aurora) model. This work is focused on TEP's Aurora models and their implications for long-term resource planning consistent with their 2023 IRP filing.

TEP delivered the Aurora data archive to stakeholders on November 13th, 2023, representing the model according to the IRP filed on November 1st. This data archive included standard zonal models for the ten portfolios presented in the IRP. Standard zonal models are short-term (ST) hourly dispatch models in Aurora. TEP also provided a handful of long-term capacity expansion (LTCE) models and sensitivity cases in this Aurora data archive. LTCE models simulate optimal resource capacity expansion over multi-year horizons in Aurora. The standard zonal models assume a buildout of hardcoded resources handcrafted by TEP. These hardcoded future resources are, most likely, the result of TEP's handcrafted resource selection process. Alternatively, the LTCE models include "New Resources" tables that define a limited set of candidate resources from which the model can build new resource capacity to achieve a lowest-cost resource portfolio over the 2023 – 2038 study horizon. The LTCE models provided in the Aurora data archive are not explicitly discussed in the TEP IRP and therefore, their relation to TEP's preferred portfolio is unclear.

It is our understanding that TEP engaged a consultant to handcraft long-term resource plans outside of the Aurora model. That modeling work was not disclosed to participating stakeholders. The Aurora modeling software is designed, among other things, to aid utilities in determining optimized resource expansion plans (subject to model design, inputs, and constraints) and is among the most used applications for developing long-term capacity expansion (LTCE) plans for IRPs. In section "5.2.2 Capacity Expansion Modeling" of the November 1st, 2023 IRP filing TEP expresses a critique of over-reliance on LTCE models to build resource portfolios. Instead TEP advocates for a combination of heuristics and domain expertise, aided by LTCE case studies, over optimization models to determine the best resource plan(s). The LTCE models that TEP did provide as part of the Aurora data archive do not align with the portfolios listed in the IRP. Therefore, the long-term planning portfolios presented in the IRP could not be adequately evaluated by stakeholders.

2. LT Model Development

Without an LTCE model consistent with the portfolios presented in the TEP IRP, empirical review of TEP's resource selection using the data and models provided by TEP in the data archive was not directly possible. As part of this work, Energy Strategies developed an LTCE model in Aurora consistent with TEP's P02 Balanced, or preferred, Portfolio as a reference point to test alternative future resource scenarios. This step was necessary because the LTCE models that TEP provided in the Aurora data archive were different from the portfolios presented in the IRP. The goal of this effort was to establish an LTCE baseline without changing TEP data inputs or assumptions. Accordingly, any potential flaws in TEP's original assumptions or inputs were not corrected by this effort. As discussed below, Energy Strategies discovered an important omission in the TEP Aurora modeling files, specifically regarding the characterization of storage performance.

To construct a portfolio similar to TEP's preferred plan within the Aurora data archive, Energy Strategies combined aspects of the TEP P02 – 400 Gas ST dispatch model, known in the IRP as the P02 Balanced Portfolio, with TEP's All New Resources LTCE model to create a P02 LTCE Reference model grounded in TEP's work that could be used as a benchmark for LTCE modeling. This process was executed according to the following steps:

1. Copy the existing All New Resources LTCE model and rename it P02 LTCE Reference.
    a. Importantly, the All New Resources LTCE Model, from TEP, includes a New Resources table defining generic energy technology resources from which the model can build new capacity. These resources are also known as resource expansion candidates.
2. Set the "First Eligible Year" and "Last Eligible Year" of these new expansion candidate resources to 2023 and 2054 respectively, such that they are available to be built throughout the LTCE study horizon.
    a. Note, TEP includes maximum build constraints on these candidate resources that limit the model's ability to realize diverse resource futures under alternative scenarios.
3. Copy "Future" resources, those with build dates after 2024, from the Resources table of TEP's preferred TEP P02 – 400 Gas ST model and paste into the New Resources table of the P02 LTCE Reference.
    a. These "Future" resources represent TEP's hardcoded assumption for capacity expansion in their preferred portfolio. Their inclusion aided in the benchmarking of this methodology against TEP capacity expansion results in the IRP filing.
4. In the New Resources table of the LTCE model, set the "First Eligible Year" and "Last Eligible Year" of these hardcoded "future" resources equal to the "Resource Begin Date" from the Resources table of the TEP P02 – 400 Gas ST model.
    a. Setting these eligibility years to the reference resource begin date guarantees that the model builds these resources when expected by TEP over a multi-year LTCE run.
5. Finally, use the cost assumptions from the New Resources table as a reference to assign Build Costs and levelized capital carrying rate (LCCR) values to the copied hardcoded "Future" resources by resource type.

a. Note, the TEP data archive did not include capital costs for hardcoded resources. Capital costs for the hardcoded resources were copied from like resource types in the New Resources table.

Unless TEP updates the data archive to correct the omission of IRP portfolios as LTCE models, any party conducting additional modeling to compare alternative scenarios using TEP's data archive will require implementing similar steps to construct a reference portfolio.

Developing the P02 LTCE Reference model with previously defined TEP inputs bounds its quality and accuracy to that of TEP's. When Energy Strategies discovered model deficiencies, we rectified the errors or omissions in developing an LTCE baseline. For example, the Storage table that TEP provided did not define storage attributes for future expansion storage resources. Accordingly, initial runs of the P02 LTCE Reference model resulted in battery storage builds that did not generate any power. After consultation with Energy Exemplar support, we augmented the Storage table to include definitions for these future battery storage resources such that they could dispatch as expected.

With the definition of this P02 LTCE Reference model, Energy Strategies was able to benchmark and test LTCE capabilities within TEP's Aurora data archive. The results of the P02 LTCE Reference model were evaluated against the new capacity build illustrated in Figure 42 of the TEP IRP filing until they matched. Then, with an LTCE Reference Model, alternative futures could be explored by the definition of various scenarios and compared against a common scenario representing TEP's preferred plan. However, these and potentially other omissions or errors may remain in the TEP data archive, which would call into question additional scenario modeling without correction of these faults.

TEP Data Archive Shortfalls

The development of a P02 LTCE Reference model by Energy Strategies intended to mimic the P02 portfolio in TEP's IRP required Energy Strategies to rely on uncertain assumptions and modifications to the TEP data archive as delivered. A summary of model gaps and shortfalls discovered in the TEP data archive is listed below. However, Energy Strategies did not undertake a comprehensive review of the TEP data archive for potential errors or omissions, nor of the validity of TEP's assumptions, and therefore scenario model results using the TEP modeling data may contain other faults.

1. The TEP data archive lacked an LTCE model that aligned with portfolios presented in the IRP filing.
2. The TEP preferred portfolio P02 relied on an undisclosed "hand-crafted" process. Accordingly, the preferred plan cannot be evaluated within the Aurora modeling framework.
3. Without LTCE modeling to guide the resource plan, TEP avoided the disclosure of projected capital costs for new resources. This gap in the data archive hindered stakeholders' ability to accurately recreate an IRP aligned LTCE model and evaluate alternatives.
4. TEP assigned maximum annual and horizon-long build constraints on new resources which limited the LTCE model's ability to explore diverse resource futures. To justify maintaining these limitations in future planning, TEP should disclose their rationale to stakeholders.

5. TEP did not define necessary parameters for future storage resources to dispatch in LTCE models. Without specifying key dispatch parameters for future storage in LTCE models, TEP's data archive led to misleading conclusions about resource generation requirements.

New Resource Candidates for Alternative Scenarios

The capacity expansion results evaluated alternative scenarios modeled using the TEP data archive are subject to the quality and comprehensiveness of the model and inputs provided by TEP. The ability of the model to arrive at distinct, lowest-cost portfolios was inhibited by the limited nature of New Resources defined by TEP and the annual maximum build constraints imposed. The suite of generic energy technologies that TEP considered for future resource builds are limited and are illustrated in the table below.

ID	Name	Capacity	Fuel	Annual Max	Overall Max
FutHybrid	Solar PV_Sto_20	150	Sun	0	15
FutWind	Wind_20	100	Wnd	1	5
FutCT	SCCT Adv_20	237	NGAZ	1	4
FutCCGT	CCCT gas_oil Adv_20	1083	NGAZ	1	2
FutAero	Aero_20	50	NGAZ	5	10
SolarTEP	Solar PV_20	100	Sun	2	25
FutBESS	Battery Storage_20	50	STO	4	40

These limitations in the modeling data highlights the need for improved, rigorous and transparent long-term capacity expansion modeling to be a part of future IRP proceedings. Hand-crafted portfolios bypass the LTCE modeling approach and obscure the ability of stakeholders to evaluate the quality of utility resource plans.

Despite Energy Strategies' development of the P02 LTCE Reference model and modest corrections to observed omissions in the data, Energy Strategies does not recommend drawing specific, empirical conclusions from alternative scenarios reviewed using the TEP data archive and LTCE models due to the limited nature of the TEP data archive used as a starting point. TEP's hand-crafted portfolios, limited definition of new resources, and the extent of modifications to TEP's original data set required to stand up an LTCE model consistent with the IRP portfolios eroded our confidence in comparing alternative portfolios, absent substantial corrections and improvements to the TEP data archive and LTCE models.

3. Key Takeaways

1. Due to limitations in the TEP data archive, Energy Strategies was unable to rigorously evaluate TEP's long-term resource plans or consider potential alternatives within the Aurora modeling

framework. The TEP data archive should be updated to support LTCE model development and lowest-cost portfolios consistent with their IRP filing.

   a. We recommend that TEP conduct resource planning with LTCE modeling at the core of their approach. Doing so will adequately open the process to stakeholders and demonstrate to the commission that lowest-cost portfolios are being evaluated. Handcrafted resource portfolios obscure scrutiny from stakeholders and the commission alike.

2. Assumptions regarding capital costs, technology-specific build constraints, storage dispatch and other parameters are key components in LTCE models that drive lowest-cost resource selection. Stakeholders were not able to fully evaluate these modeling assumptions. To support a transparent, collaborative process with stakeholders, TEP should provide input assumptions, their justifications, and supporting information.
3. Across all futures explored in TEP's IRP, the lowest-cost portfolio builds at least 500 MW of wind, 1740 MW of solar, and 1330 MW of battery storage over the study horizon. This build suggests a set of no-regrets resource expansion plans that result in at least 3.5 GW of non-emitting capacity.
4. The concurrent expansion of both solar and storage resources can serve future firm capacity needs. Hybrid solar plus storage resources will be fundamental to supporting TEP energy and capacity needs while maintaining policy goals around emissions.
   a. The portfolios which resulted in the largest solar capacity, also resulted in the largest storage capacity. Further, the rank order of portfolios by solar capacity mirrors that of storage capacity.

4. Key Dates

- June 13th, 2023: APS/TEP host Joint RPAC Modeling Workshop.
- June 28th, 2023: TEP delivers Aurora Modeling Archive v1. This archive did not include sufficient detail or model development to support LTCE modeling.
- June 29th, 2023: APS/TEP IRP Kickoff meeting. APS presents a slide presentation review of their model. TEP responds to questions from stakeholders.
- September 29th, 2023: TEP/UNSE RPAC Meeting – Stakeholders request updated archive to begin review. TEP did not provide updated data.
- November 1st, 2023: TEP files their IRP.
- November 13th, 2023: TEP delivers Aurora Modeling Archive v2 – This archive still did not include a long-term capacity expansion model as expected, but WRA technical consultants were able to build an LT model generally consistent with TEP's Preferred "P02 Balanced Portfolio" from the components provided. This LT model relied on assumptions developed by Energy Strategies rather than a coherent LTCE model provided by TEP.