



TEP/UNSE Public Workshop

Date: Monday Oct 2, 2023

Time: 1:00 pm – 3:00 pm MST

Microsoft Teams link provided to all registered participants.

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- 1:00 Welcome, Introductions, & Logistics
 - 1:15 Introduction to TEP & UNSE
 - 1:30 2020 IRP (Reference Case with New Additions)
 - 1:40 Key Input Overview (Load, Market, Technology Costs)
 - 1:50 Inflation Reduction Act (IRA)
 - 2:00 Resource Adequacy
 - 2:15 Portfolios
 - 2:25 Results
 - 2:40 Open Discussion

This Meeting Summary is intended to document key points of discussion that occurred during the meeting. By providing a high-level written summary of the meeting, RPAC members will have an opportunity to correct, clarify, or amend the discussion points so that TEP has as accurate an understanding as possible of members' ideas and positions. In addition, this summary will allow those that have an interest in the IRP, but are not on the RPAC, to follow the process.

The majority of topics discussed at the meeting will have associated "slides", and this Meeting Summary is not intended to summarize the slides. However, the discussions that occur in response to the presentations will be summarized, without attribution.

Attendees	Organization
Alex Routhier	Western Resource Advocates
Andrew Breyer	Aypa Power
Autumn Johnson	Tierra Strategy
Benjamin Nead	Greater Tucson Climate Coalition
Bob Cook	Tucson Climate Coalition
Brian Korpics	New Leaf Energy
Bridget Sidwell	Strata Clean Energy
Bruce Plenk	Solar Possibilities Consulting
Caryn Potter	SWEEP
Catalina Ross	Sierra Club
Cathy Kim	Copia Power
Chaunce De Roos	Arizona Corporation Commission
Emily Doerfler	Western Resource Advocates
Fatima Luna	City of Tucson
Garrett Weaver	City of Tucson Commission on Climate, Energy, and Sustainability
Greg Patterson	Arizona competitive Power Alliance
Ian Calkins	Copper State Consulting Group
Jane Conlin	Citizens Climate Lobby
John Laitner	Economic and Human Dimensions Research Associates
John Hughes	Hughes Consulting
Judith Anderson	Tucson Climate Coalition
Kate Bowman	Vote Solar
Kyle Heckel	Salt River Project
Lukas Tejada	JUWI Inc.
Luke Hutchison	Arizona Corporation Commission
Mandi Leatherland	City of Tucson
Marcelino Flores	Pima County
Mark Lawlor	ConnectGen

Matthew Pagan	Enel
Michelle Brandt King	Holland & Hart LLP
Murphy Bannerman	WRA
Ojas Sanghi	AZYCC/UAZDivest
Patrick Black	Outside Counsel – Freeport Mineral Inc.
Patrick Woolsey	Sierra Club
Robert Bulechek	Energy Management
Russell Lowes	Sierra Club Rincon Group
Sandy Bahr	Sierra Club
Sarah Buck	Innergex Renewable Energy
Sarita Morales	IBEW Local 1116
Stephen Addison	City of Tucson
Stephen Cassidy	US Air Force DMAFB
Stephen Jennings	AARP Arizona
Steven Lesh	Rate Payer
Tara Beske	APS
Terry Finefrock	Self
Tres English	Sustainable Tucson
Tyler Fitch	RMI
Blake Pederson	TEP
Bonnie Medler	TEP
Brianna Robles	TEP
Calvin Dacus	TEP
Catherine Schladweiler	TEP
Chris Norman	TEP
Ilse Morales Duarte	TEP
Jenny Crusenberry	TEP
Joe Barrios	TEP
Joe Salkowski	TEP
Karen Kansfield	TEP
Lee Alter	TEP

Lauren Briggs	TEP
Mike Sheehan	TEP
Nonso Emordi	TEP
Rhonda Bodfield	TEP
Sam Rugel	TEP
Victor Aguirre	TEP

Victor Aguirre (TEP – Manager Resource Planning and Procurement) – 2023 Integrated Resource Plan (IRP)

Lee Alter (TEP – Lead Supply Side Planner) – 2023 Integrated Resource Plan (IRP)

- **Question:** How does using AZ Ratepayer funds to purchase remote electricity from New Mexico's economy instead of local AZ Solar, then using expensive and vulnerable transmission infrastructure to deliver to Tucson, 8% energy loss, improve AZ ROI, costs and reliability?
 - **Response:** When we look across the board at the region, we are trying to optimize our total system around both transmission and generation. Eastern New Mexico has some of the best wind in the desert southwest. We look at opportunities to take advantage of lower priced wind, especially for the evening hours, that is less expensive than what we could acquire here in Arizona.
It diversifies our portfolio in terms of time-of-day use. There was no new transmission built for that power. The wind quality out there is so good that it's very cheap, especially without new transmission costs. We, however, anticipate a lot of the solar and storage to be located locally.
- **Question:** What does the acronym ELCC stand for?
 - **Response:** Effective Load Carrying Capability. It's a probabilistic based analysis that looks at how much of a resource would you have to add to maintain the same level of reliability.
- **Question:** Does the Solar & Storage Portfolio include any wind? Was any consideration given to geothermal?
 - **Response:** Yes, we anticipate it would have approximately 500 MW of wind. "Solar" in this context just means renewables. And all resources would be developed through All Source RFPs so different technologies

- could be considered - even geothermal, if a cost-effective resource were identified.
- **Question:** Is there enough capacity in TEPs existing transmission lines for the new resource additions? Will new transmission lines or upgrades on existing lines be needed?
 - **Response:** There is adequate physical capacity on TEP's transmission system, but required upgrades and associated costs will always vary based on interconnection points and system conditions.
 - **Question:** The TEP 2020 plan suggested CO₂ emissions down to about 7 million tons in 2022. And 7 million short tons is the rough equivalent of 6.4 million metric tons. The TEP June 2023 report for EEI showed ~7.4 million metric tons in 2022. Together with added purchased generation of 0.6 million metric tons also in 2022, the TEP total CO₂ emissions equivalent are more like 8.0 million metric tons. Can you explain the difference? At a social cost of carbon at \$150/tonne, the total social cost of 8 million tonnes is more like \$1.2 billion in 2022. How do these details figure into the new IRP?
 - **Response:** I will point out that in 2022, we did retire the San Juan Generating Station, which was a coal plant and I think the charts we're showing here start 2024 which reflect that retirement. I think the numbers that you're seeing, are correct and certainly as we model our portfolio, we're using similar metrics or at least emission profiles that we've seen historically. It's really reflected in our carbon reduction goal. We set as a company goal to reduce carbon emissions 80% by 2035. And you know, that's really driven by two factors. The first of them is a need to reduce carbon to address climate change. We recognize that's needs to be a driver of our resource transition plan. The other element is risk. Frankly, there are risks as you move forward in time associated with the

continued operation of coal plants in an environment where other plants are being shut down when coal supplies become less reliable, when rail service is less dependable. I think that's where you're seeing the societal cost of carbon. It's really reflected in the overall target that we are trying to hit and it's the reason why every portfolio that we are considering, hence that target and that's in recognition. I know the Commission has gone through that process of looking at external societal costs and it just becomes very complicated and very controversial to sort of defend those positions. certainly, we understand the intent of the question, but to Joe's point, the CO₂ reduction is front and center and all of our portfolios.

- **Question:** *Is the cost/kwh shown for the various scenarios the likely cost to ratepayers for TEP power in those years or the cost of the new additions which would be rolled into older plants, etc.?*
 - **Response:** There was a slide that represented the rate impacts of the various scenarios and that represented our current case best estimate of how those costs associated with these improvements would be reflected in rates. What that doesn't include is everything else that we're going to be building as a utility company between now and then. So don't take those charts as a promise of future rates.
It does give you a way to compare the impact on a cost per kWh basis of the different portfolios that we've constructed for consideration. That is one of the considerations that ultimately guides our selection of the portfolio that will present when we submit our plan on the 1st. That is basically our existing generation fleet plus new additions.
- **Question:** *When do you expect to issue your next RFP, and will it be tied to the IRP being confirmed by ACC?*

- **Response:** We haven't yet, but I think this IRP that will be submitted on November 1st will inform our next All Source RFP. We plan by the end of this year or early next year to execute and start. Certainly, any decisions that come from the ACC will overlap with our process.

- **Question:** Please explain how power generated at no capital cost to TEP can cost your customers more than TEP generating it.
 - **Response:** The answer is likely that on a long-term basis, when we capitalize the cost, we do so over time. If we were to spend \$100 million on a project that would get introduced into our rate base, we would not recover \$100 million right away, we would recover that over time on a schedule that is approved by the Corporation Commission. The immediate cost of that system could be more or less than the cost of purchasing power through a power supply agreement. I think we're always trying to evaluate whether our customers are better served by a project that is developed through a PPA, where we are simply buying the power or a project where we are investing the capital, and it has differed from project to project over time.

- **Question:** I think it was mentioned you are selecting a portfolio to "present" to the ACC. Does that mean you are now selecting a preferred portfolio in your filing?
 - **Response:** So, the rules require us to select a portfolio, and I think in the final IRP we're going to be highlighting or selecting one. We always have the caveat that we don't have a crystal ball and we'll have to see what the next ASRFP produces. So, we can pick a portfolio that we think would be the most important beneficial to our customers, but we never really know until we get the bids in, and sometimes we get bids that are

- unique, we can model them with the very same tools that we've been showing today and see how the net present value might change.
- **Question:** How can you assume natural gas prices will be flat in the next decade when fugitive methane emissions should be capped in the next decade raising these prices?
 - **Response:** These prices come from the Energy Information Administration, and they have a global energy model, and other economic models. They look at LNG forecasts; it is a public data source that we felt confident using.
 - **Question:** Why doesn't TEP track/retire CH₄ Natural Gas emissions, upstream and post-combustion, that are much more heat trapping, create greater community damage, than coal/CO₂?
 - **Response:** It's very difficult to know what kind of methane emissions TEP would be accounting for. We get our gas from two different basins, thousands of different wells, the handful of which are super emitters. EPA has developed the regulation for methane emissions. This has always been an issue with the cost of environmental regulations and how much these externalities are being incorporated. The gas industry has a lot of regulations that they must follow. So, the more that is done to regulate methane by voluntarily regulation, the more that that comes into our economics.
 - **Question:** There are lots of reports fracking field depletion and aquifer contamination? Any comment?
 - **Response:** We have resource plans every few year that gives us an opportunity to remain apprised of the current state of the industries that we're connected to. If the field of play changes, as regulations change,

and as gas reserves levels change, we can take those impacts into consideration as we move forward. That is again one of the benefits of doing this over time.

- **Question:** What amount of carbon dioxide produced by TEP is presently sequestered?
 - **Response:** We are not actively sequestering as part of the generation process any of the carbon dioxide production it is.

- **Comment:** I'm very concerned about the issue of climate change. We are currently on track globally to hit 4 degrees centigrade of warming over the preindustrial average. That's going to lead to the mass migration of 3 billion people worldwide and is going to lead to most of our days in the desert Southwest being over 90 degrees Fahrenheit. I appreciate the TEP shutdown of the Navajo Generating Station and the addition of 46 megawatts of renewables. That is a step in the right direction and certainly appreciated. We should be shutting down the Springerville Generating station as quickly as possible and shutting down our gas generating assets as quickly as we can. I would like to see in the integrated resource plan a focus on technology such as that will enable expanding our renewable energy in our electrical grid. So, things like flow batteries allow us to have discharge cycles that allow them to operate over 20 to 30 years and are currently being used in China and Germany. Iron air batteries can be discharged over a period of 100 hours and can be used to provide, and assist based on load of the electricity from renewable sources.

- **Question:** I was wondering if TEP, like many other businesses, now includes a carbon price in your projections, and if you do, what is that amount?

- **Response:** To some degree we do because we participate in the Western Energy Imbalance Market. Participants must account for CO₂ emissions and the cost of allowances, which is a market-driven price. So we do not explicitly account for that, but as you can see all of our portfolios are designed to meet what we determined would be our fair contribution to global emission reductions.

We worked with the University of Arizona for the 2020 IRP and looked at the 1- and 1/2-degree goal that the that the UN established to keep on the trajectory of that path. This path is beyond 2038, and beyond the horizon of this planning period. The costs of carbon are something that we obviously take seriously. We are moving as fast as we can to retire coal units without losing power. Taking the cost of carbon into account, while we don't attach a dollar per ton to it, is driving our whole plan.

- **Question:** It's my impression that the Palo Verde Power Nuclear Unit is part of the baseload power in the grid. That includes the other power users, both in California, Arizona, and New Mexico. As we look at that generating unit, which is a non-carbon dioxide producing unit and look at the issue of their own problems, similar to what we are seeing in France and Germany at the moment. What do you see as factors that, as a power producer over the next 5-10 or 20 years, affects the availability of power that can be bought commercially and offset some of your carbon dioxide production?

- **Response:** Palo Verde, from the conversations we had with the other utilities, is going to be a long-term option in their portfolios through 2050. There have been discussions about potentially extending that. I know other utilities are looking at nuclear type technologies like small modular reactors for potential base load. Long term, we would certainly be interested in in partnering with utilities in the future on projects like that, but that's not something that TEP is going to take on by itself. We're

- probably too small of a company to go down that road alone. Palo Verde is currently about 3800 MW of generation capacity. So, while it is a clean resource, I think over time they'll probably look at options around that, but certainly for TEP our focus is on renewables and storage.
- **Question:** How much of your portfolio planning is determined by the assets like the peaker generators that you purchased in the previous years? A lot of people call those stranded assets that could be retired sooner.
 - **Response:** Our plan has 900 MW of coal retiring. Both of those would be years earlier than originally expected and financed. We account for any fuel costs when they shut down. But in terms of stranded assets, we assume that those would have our costs that we recover. Albeit at lower rates because we're assuming we don't have to pay a debt rate, but we do account for stranded costs and all our retirements.

I think what you what you'll see in the in the final resource plan is the average capacity factor of our gas fleet doesn't change a whole lot over the long term. It stays in the in the 30% range s in terms of its average annual use. The renewables and storage come in and they're going to squeeze out your coal plants, but then they're going to increasingly keep it at bay. If not squeeze out your gas usage. So, we see gas becoming an intermediate resource transitioning to a peaking resource. The most efficient gas resources that we have currently would be the ones to be last to retire because we keep those on for liability and they're efficient and they basically act as your backup from renewables as you proceed down this clean transition.
 - **Question:** My question, is to what extent is the next IRP planning for opening the wholesale energy market via the MPEX program for large corporations or for cities and counties to access the wholesale energy market?

- **Response:** While the MPEX program has been implemented in other utilities, the issue that we see going forward with the program is the capacity on our system.

It is possible to go out to the wholesale market and buy firm power. On the hottest days, capacity is tight within the region. Power purchased from a wholesale marketer could be cut in the middle of the day, requiring TEP to cover that capacity.

While programs like MPEX may have been attractive probably five years ago because the price of natural gas was significantly lower, current forward wholesale market power prices are \$80.00 - \$90.00 per MWh around the clock on an annual basis.

The program will be available for customers here at TEP but we do not think that we're going to see a lot of interest in it because market prices are high. Over time we will see that if that program continues to evolve, if customers are willing to invest in resources that bring capacity to the system, that will have a lot more likelihood of being something the company would in resource planning.

If 20MW went to the MPEX program, that would be an extra 20MW that we would be exposed to and would have to build our resources to cover.

- **Question:** [During the 2020 IRP, the recommendations of UA that you referred to were not adopted. Would you re-consider their recommendations?](#)

- **Response:** The 2020 IRP included a carbon reduction goal that reflected a partnership with the University of Arizona. It was our desire to develop a plan that kept our company aligned with the carbon reduction levels and target set in the Paris Agreement. We are pursuing a resource development plan that targets that goal. So, from our perspective, we

are aligned with the guidance that we received from the University of Arizona on carbon reduction.

- **Question:** Please explain how the IRP fits with the City of Tucson Climate Plan?
 - **Response:** One of the goals articulated in the Climate Action Plan is a clean energy supply agreement for the City of Tucson. It's outside the auspices of the IRP, but we're certainly monitoring those conversations from a resource planning perspective because they may affect the timing of some of the resources as we bring them online. It interacts with our planning processes because we want to be sure that we have the resources coming online on timeline that is aligned with an agreement that we hope to reach with the City of Tucson.

- **Question:** A lot of people will believe that distributed generation and storage with microgrids is the architecture of the 21st century. What plans, if any, does TEP have to implement that architecture?
 - **Response:** That's a little outside the box from a resource planning perspective. But it is something that our distribution engineers look at. They are trying to find ways to manage and upgrade our grid in ways that accommodate customer cited energy resources, distributed generation, and distributed storage.

We are also working with our industry on ways that we might someday utilize some of that residential-based storage. We hope in five- or ten-years residents are going to have at least one giant battery in their driveway, and it will find its way into our resource planning process.