



Resource Planning Advisory Council – Virtual Meeting

Date January 12, 2023
Time 10:00 AM – 12:00 AM MST
Location Online

Agenda

- TEP and UNSE Load Forecasting (continued from 12/15/2022)
 - Current 15-year forecast and use in resource planning
 - Recap of methodology, major assumptions, and load drivers
 - Summary of plans for future forecasts and methodological updates
 - Options for creating future load scenarios to test robustness of alternative resource plans
 - Q&A

- Portfolio Modeling
 - Overview of TEP/UNSE modeling software and approach to designing and evaluating alternative portfolios
 - Illustrative example of a 100% clean portfolio
 - RPAC licensing options for modeling software
 - Initial discussion of resource portfolios that TEP/UNSE can evaluate
 - Methodology and major drivers and assumptions
 - Plans for future forecasts and methodological updates

- Next Steps & Topics for Next Meeting

Attendees	Organization
Stephen Jennings	American Association of Retired Persons
Autumn Johnson	Arizona Solar Energy Industries Association
Damian Rueda	Davis-Monthan Air Force Base
Allison Moore	Fresh Produce Association of the Americas
Yves Khawam	Pima County
Catalina Ross	Sierra Club
Sandy Bahr	Sierra Club
Caryn Pitter	Southwest Energy Efficiency Project
Jeff Powell	Sun Corridor
Rob Lamb	GLHN
Kevin Koch	Technicians for Sustainability
Dr. George Hammond	University of Arizona
Alex Routhier	Western Resource Advocates
Murphy Bannerman	Western Resource Advocates
Cynthia Zwick	Wildfire
Claire Michael	Wildfire
Bonnie Medler	TEP
Brianna Robles	TEP
Daniel Bache	TEP
Ilse Morales Duarte	TEP
James Elliott	TEP
Jenny Crusenberry	TEP
Joe Barrios	TEP
Joe Salkowski	TEP
Karen Kansfield	TEP
Lee Alter	TEP
Megan Garvey	TEP
Mike Sheehan	TEP
Nonso Emordi	TEP
Victor Aguirre	TEP

Lee Alter (Lead Analyst & IRP Program Manager) – Introduction

Daniel Bache (Lead Forecasting Analyst, Rates & Revenue Requirements) – Forecast Methodology & Results *Continuation*

Slide 16-17

- Question: RPAC Member: Clarifying question, on previous couple slides for peak forecast 16 and 17, are those up to date, actuals, or are those predictions? Why is there such a big peak?
 - Response: The (plot) is not weather-normalized, also, 2020 and 2021 had a lot of Covid impacts where a lot of residential customers who are more peaky were working from home.

Slide 19

- Question: RPAC Member: What large mines are proposed in the UNSE area?
 - Response: I don't have the ability to release the specific names of the mines in the forecast at this time.

Slide 21

- Question: RPAC Member: Clarifying questions for the DSM and EV assumptions: in the 2020 IRP, TEP committed in the five-year action plan to commit to 1.5% of prior year sales for Energy Efficiency. I am curious why that was not reflected in the low, base, or high scenario and if that was a consideration. I would encourage that to be modeled as well since that was based on prior IRP cycles. Also, for EV, provide more detail on standard deviation and fluctuation of +2 and -2, and how that relates to the state-wide transportation electrification plan targets that the Commission directed TEP and APS to focus on back when the plan was approved at the end of 2021.
 - Response: The 1.5% DSM is definitely something we throw into the scenarios. I was aware that 1.3% was the new rule set by the ACC and that is what we use in every year of the forecast.
- Question: RPAC Member: 1.5% was specifically related to the five-year Action Plan. I would encourage that as something to explore.
 - Response: That sounds great. Going to the EV state-wide transportation plan, I am not too familiar with it, was that about emission reduction?
 - RPAC Member: It was a plan to discuss the appropriate level for the state – TEP and APS service territories – to work towards greater levels of electric vehicles in their service territories. The report is attached. The scenario the Commission

adopted focused on TEP and APS together and it had a breakdown for TEP as well. The scenario focused on the medium and high adoption scenarios.

Details in the report include GHG emissions reductions, overall economic benefits, and other benefits such as societal and air quality benefits, what would be possible in a 10yr timeline.

- Response: We'll definitely review the material you sent over.

- Question: RPAC Member: On slide 21, the load scenarios, is that what you are saying was based on APS' RPAC?
 - Response: These are not exactly the same numbers but the same levers we pulled at APS. Those are all relative here at TEP.

- Question: RPAC Member: Can you explain the 2 standard deviations and what they are?
 - Response: Standard deviation is a measure of dispersion. With the different scenarios that the consultant would run, we would take the top 95 and 5 percentiles.

- Question: RPAC Member: Each of these load scenarios are relative to a baseline economic scenario, is that correct?
 - Response: Yes, that is correct.

- Question: RPAC Member: How do you see remote work evolving from labor movement?
 - Response: Early on in the pandemic, the concern was the uncertainty of when returning to the office would take place. As far as the forecast, it was challenging and resulted in a possible incorrect assumption of when returning to the office would take place. At this point, remote work impacts will slowly stabilize in the next few years. We are still closely monitoring this.

- Question: RPAC Member: Curious to know if you will use the DSM hourly shape for all other scenarios or will you compare the base scenario to the others? For the work Guide House will be doing, will they be plugging in hourly profiles at the measure level or program level?

- Response: For all the scenarios, the hourly shape will be produced by Guide House, we will scale the shape up or down based on the scenario. Hourly profiles will be at the program level.

Slide 4-5

- Question: RPAC Member: I noticed that you show the coal units that have retired, but did not include projected retirements, is there a reason for this?
 - Response: Load and Resource chart is from 2017 IRP to emphasizes how it was done traditionally. Projected retirements are not included here.
- Question: RPAC Member: You mentioned 15% reserve margins, is that a statewide reserve margin or is it decided by the utility? How does that compare to other utilities that have outages?
 - Response: The 15% is based on statistical analyses that don't have to be updated often. There is no standard it is an industry convention. The most common outage is 1 event in 10 years, the event could last 1-10 hours, it is undefined. When analyzing a system with generators going out occasionally, you can predict how much reserve margin is required. The 15% is the historical result that the industry experts have defined.
- Question: RPAC Member: Is the on peak for time of use still 3-8? Are there different rate plans to incentivize EV charging during the day or late at night?
 - Response: Unanswered
- Question: RPAC Member: How many TEP customers that have electric vehicles are on a time of use rate? Encourage looking at that, and integrate it into the model, would have a huge impact on the peak demand.
 - Response: We do have a couple programs that target later evening hours (10pm – 5am). These programs provide discount for charging during these hours. Customers taking service under this rate plan must have a qualified highway approved Battery Electric Vehicle or Plug-in Hybrid Electric Vehicle as determined by the Company's sole discretion and appropriate home charging equipment. We can look into the number of customers on these rates as a part of future EV discussion.

<https://docs.tep.com/wp-content/uploads/111-TRDSOTE.pdf>

Slide 23-25

- Question: RPAC Member: There is an important resource planning component to rates, the point of time of use is to manage peak. I encourage to include predicted impacts from rate design on your peak and resource plan.
 - Response: We have seen a step change in market prices over the last 3 years. 2018-2019, we observed on peak prices during the summer that are \$25-\$30/MWh. In today's market we see \$250-\$300/MWh during the summer. There have been more efforts to reduce peak demand issues, not only does it benefit customers, but it is also starting to look more economic, and more incentives offered. This upcoming IRP will include the discussion of impacts of the market and pricing.

- Question: RPAC Member: Renewable curtailment that might be associated with having no place to put it, would that inform decisions on additional storage?
 - Response: Absolutely, it might not be worth it if curtailment is 5% - 10% as that is seen as acceptable. There are a lot of economic studies of at what point it becomes economic to add more storage to prevent that curtailment.

- Question: RPAC Member: Are you only allowing renewable generation to charge storage, or can firm resources also charge storage? It seems like Aurora is only being used for dispatch, the commission stated they wanted to see capacity expansion modeling in upcoming IRP. Are the portfolios shown hand built, or created through capacity expansion modeling?
 - Response: In this specific study, it is not linked to renewables. We do have the option to charge storage either way, but generally we do use renewables to charge storage. The portfolios are hand built and will discuss capacity expansion modeling at a later date. When doing capacity expansion modeling, it reviews a tremendous number of combinations over an extended period. It is not a fully constrained model; it doesn't address reliability issues and will have to run it through an additional reliability analysis.

- Question: RPAC Member: The forecast for gas prices vs. actuals were extremely different. I would like to see an aggressive high gas price sensitivity run. The NERC website shows 20% reserve margins, is it possible to do a run with higher reserve margins? What technologies are you considering firm? How will this evolve over the course of the IRP? Will you be considering earlier dates for coal retirements?
 - Response: We will adjust the model to account for aggressive gas prices. For reserve margins, each summer we look at the weather forecast, when the

forecast shows hotter than expected weather, we push our reserve margin to the higher 20%, in 2021 TEP did that and bought more power to have that higher reserve margin.

- Firm is anything that can be called upon reliably, it could be a combination of resources that are individually fully available or are fully available in combination. It is not necessarily only thermal, it could be thermal hydrogen, a dam, nuclear plant, extra transmission capabilities, etc.
- Given the time frame it would be difficult to put in that many resources to retire coal earlier, unless there is a big change on prices and/or technologies, that could happen, but as of now it seems very difficult to shut them down sooner. The 2032 date is firm and committed to by FORTIS.

- Question: RPAC Member: Does "Firm Resource" refer to natural gas? What would be the offset if renewables and storage were combined with targeted DSM measures, what could be the potential difference with a reduced peak?
 - Response: We do look at the benefits of different resources and/or programs paired together, for example, solar + storage, but also take a look at things such as the reliability that is added by new resources and so on. But we will this keep in mind.

Slide 26

- Question: RPAC Member: What is the deadline to give you scenarios to have you run them?
 - Response: Let's start off by having the first 10 portfolios and we can go from there.

- Question: RPAC Member: Are we going to talk about these portfolios during this meeting only or the next one as well? In the heavy solar for example, would we add in the short duration storage?
 - Response: We can talk about them the next meeting as well. Yes, there would be storage included as well

- Question: RPAC Member: What reliability constraints are you looking at when building this? Resource adequacy is an issue, what metrics are you looking at when building this portfolio?

- Response: With loads and resources table, looking at capacity values in slide 4, one way is to check the resource adequacy, another way is to look at every hour, not looking at the system from hour to hour, for that more refined level of analysis need to up our game with Aurora. Working on getting up to 6 years of solar/wind/load, have more opportunity to make sure the portfolio is on the mark.

Next Steps

- Cost assumptions, ASRFP updates.