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Meeting Minutes

Resource Planning Advisory Council – Virtual Meeting

Date January 25, 2023
Time 9:00 AM – 12:00 AM MST
Location Hybrid – In-person & Online

Agenda

- All-Source RFP Update / Q&A
- RPAC Survey Results
- Update on Major Cost Assumptions
  - Natural gas and power prices / Q&A
  - Capital costs for solar, wind, 4h battery storage, and solar + 4h battery storage / Q&A
- IRA Tax Incentives and Methodology for Projecting Future Prices / Q&A
- Continued Discussion of Portfolios and Scenarios to Model
- Next Steps & Topics for Next Meeting

Attendees	Organization
Alex Routhier	Western Resource Advocates
Autumn Johnson	Arizona Solar Energy Industries Association
Bentley Erdwurm	RUCO
Brianna Robles	TEP
Caryn Potter	Southwest Energy Efficiency Project
Catalina Ross	Sierra Club
Claire Michael	Wildfire
Damian Rueda	Davis-Monthan Air Force Base
Dr. George Hammond	University of Arizona
Eric Wilson	Pima County
Jeff Powell	Sun Corridor
Kathy Knoop	GM
Laurie Woodall	RUCO
Rob Lamb	GLHN
Sandy Bahr	Sierra Club
Stephen Jennings	American Association of Retired Persons
Yves Khawam	Pima County
Ilse Morales Duarte	TEP
Jenny Crusenberry	TEP
Joe Barrios	TEP
Joe Salkowski	TEP
Lee Alter	TEP
Mike Sheehan	TEP
Nonso Emordi	TEP
Rhonda Bodfield	TEP
Victor Aguirre	TEP

Victor Aguirre (Lead Resource Planner) – All- Source Request for Proposals

Slides 7-12

- Question: RPAC Member: Was there a certain number for DSM capacity that was requested in the RFP? Were there any constraints for the DSM project?
    - Response: There was request looking for large projects, preferably an accumulation of more than 10 MW. Targeted total number of capacity and energy did not target specific MWs for any specific project. Minimum capacity was 50 MW, but for DSM it was lower. The ASRFP stressed need for capacity, there are no real constraints for DSM.

- Question: RPAC Member: What is the number of months for turnaround if the interconnection queue is 18 months? How long will it take to for a project come online? What resources fall into firm category?
    - Response: Process starts with a feasibility study, to see if it's achievable then advances to an impact study. If it passes the impact study, it goes into a facility study to determine cost for the interconnection. 18 months is the fast track to get these studies done. Goal is to have these capacity needs met by 2024-2025. Batteries are considered firm along with thermal and nuclear. Firm capacity is known as supplying 4 hrs. of continuous power during the summer peak hours.

- Question: RPAC Member: Are those firm capacity projects gas plants?
    - Response: The projects shown do not include any gas.

- Question: RPAC Member: I noticed the average, solar and wind combined for twice as much capacity as solar and battery, there's a renewable option for the same price. How firm does that look?
    - Response: Geographical diversity for solar and wind is very important. Wind is hard to predict, solar is easier for our region, it is extremely predictable and easier to pair with storage. Heavy solar with storage pairing and wind used as a backup. Our service area has transmission constraints that need to be considered. Some projects may be cheaper as far as pricing but there is a heavy transmission constraint.

- Question: RPAC Member: Can you explain difference between energy only and energy+ capacity columns? What story are you trying to tell from the proposal pricing slide? What is a simple explanation of a load pocket?
    - Response: The capacity portion comes in when we can dispatch the power.
    - It informs the raise in price between each category. This is an average of all the bids.
    - In TEP's case, the load pocket is Tucson and the metropolitan area, UNSE load pocket is Kingman in Mohave County and Nogales in Santa Cruz County, also known as our service areas.

Ilse Morales (Resource Planner) – Results and Discussion of RPAC Member Survey

Slide 13

- Comment: RPAC Member: I really wanted to see TEP move away from fossil fuels. TEP can help lead that global effort!

Nonso Emordi, PH.D. (Lead Resource Planner) – Major Cost Assumptions

Slides 15-20

- Question: RPAC Member: Is this chart what you're using going forward for the IRP? The conflict in Ukraine is not ending any time soon, the US is subjected to the international gas markets, are you doing any other scenarios to predict these gas prices?
    - Response: Low gas prices are not unreasonable; we will look at alternative gas. We use a few different gas prices; it helps the diversity issue. We have a base price for these scenarios along with sensitivities, we must give a lot of thought for high and low cases. We need to discuss issues we may foresee as far as gas or global conflicts. We need to anticipate how our system will respond to these issues.

- Question: RPAC Member: Are you thinking of replicating this graph or representation for different resources for the different incentives from the IRA? How does that help to reduce incentives? Looking for additional resources, subsidized and unsubsidized cost estimates for storage and iterations for behind the meter.
    - Response: We can replicate this graphic for different resources; the graphic will be a bit different for DG and EE because they have different incentives.

Lee Alter (Lead Resource Planner) – Portfolio Modeling

Slides 24-27

- Question: RPAC Member: You talk about starting with the 2020 IRP as a reference case, but will the assumptions on capital costs be updated with real data from the ASRFP?
    - Response: We will be updating capital costs, modeling improvements, prices, etc. and have started already.

- Question: RPAC Member: Are the different scenarios only changes in resources or only load profiles?
    - Response: It can be both changes in resources and load profiles. Transmission changes are also an improvement in question - lower transmission costs - access to new areas.

- Question: RPAC Member: It would be interesting to include a sensitivity to change rate plans/tariffs and how it impacts customer behavior. Are there ways to impact the load curve to make it more beneficial?
    - Response: We will review studies that look at elasticity of demand to electricity prices by customer class. We are aware of the issues but struggle to make the connection between rates and consumer behavior. It is challenging because the consumer is the variable.
    - The best way to do this is to utilize different resources that will adjust your peak load like time of use rates, and how that impacts peak load. As well as energy efficiency, there are a lot of things that fit into load management. This will help inform the direction of these portfolios
    - We know the effects of DSM therefore we can start modeling and shaping the load to see the benefits and challenges also to view which programs will be most beneficial

- Question: RPAC Member: Is there a way to look at the portfolios and divide them between generation fleet and second level of uncontrollable market climate conditions (ex. Gas prices)? How do those initial portfolios of generation compare against the uncontrollable portfolios?
    - Response: That is exactly how we used to analyze the portfolios, it is the most logical way to analyze the portfolios and we will continue this process through this IRP.

- Question: RPAC Member: The thermal extension seems arbitrary. Coal is not easily dispatchable, its expensive, you have previously expressed retiring coal. Changing retirement dates will have political implications. Will the model provide reliability issues? Will the model be able to determine how much longer it would need to keep the coal?
    - Response: We want to review cumulative emissions (total tons over the 10-15 years). We want to understand how we can mitigate this. The last couple years we have had real world reliability risks. We helped cofund a regional resource adequacy study in the desert southwest, one of the main conclusions was that we will not be able to meet current IRP goals unless we stick to our schedule. Not following this schedule causes a risk. These portfolios are intended to cover multiple objectives. The thermal extension portfolio could serve as a least cost – high risk scenario.

- Question: RPAC Member: Regarding rapid electrification and DSM, where are you putting in the assumptions of well managed EV charging and bidirectional EV charging? Do you look at residential battery charging?
    - Response: This would be apart of the DSM portfolio but won't include until long-term proven technology is on the market, it is premature to look at EV's as a utility's resource.

- Question: RPAC Member: Have you looked into the local water resource utilization, and how it's being levered? Especially considering thermal vs. renewable options and how much is required? Can see this being a huge risk
    - Response: We included this in the last IRP and will continue in this next IRP.

Next Steps

- RPAC members to send in scenarios, sensitivities, and portfolios of interest for discussion – RPAC@tep.com