SUMMARY OF JUNE 8, 2022, TECHNICAL SESSION #1

On June 8, 2022, PNM held the first of a planned series of technical sessions for stakeholders devoted to discussing the advantages and disadvantages regarding the application of different technical methodologies within the modeling framework for the 2023 Integrated Resource Plan (IRP). Director of Integrated Resource Planning Nick Phillips acknowledged the desire of stakeholders to be more involved in the early stages of the IRP's development and to maintain a role throughout the process as PNM develops inputs to the modeling framework.

Mr. Phillips encouraged participants to offer their ideas about new or different ways of modeling, both qualitative and quantitative. He stressed that the focus of the technical sessions is to reach the best possible development process for PNM customers through the examination of different perspectives and pathways—all with the goal of being 100% carbon free by 2040.

After a review of the key findings of the studies presented at the May 25, 2022, meeting, Mr. Phillips presented the modeling framework and opened the floor for questions, which covered, inter alia, loss of load probability modeling, LOLE versus EUE metrics, and system resiliency in the face of extreme weather.

A full list of questions follows below.

MEETING ATTENDEES

A total of 27 stakeholders, not including PNM staff, attended the meeting, including members of the public and representatives from the following organizations: Brubaker & Associates, CSolPower, InterWest Energy Alliance, and Sandia National Laboratories.

Meeting slides can be found here.

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STAKEHOLDER QUESTIONS/COMMENTS

Stakeholder	Question/Comment	Categories
Brubaker & Associates:	The last time around you did some limited work when doing resource selection, allowing certain transmission upgrades or projects to be selectable in the optimization. Obviously, there are limitations on computing capability. Do you envision doing some of that this time around as well, [to the extent] it's workable and practical within current computing limitations?	Transmission
Brubaker & Associates:	How is transmission going to be worked into the IRP? What assumptions are going to be made about market support? What are the plans to tackle ELCC (Expected Load Carrying Capability)?	Transmission Reliability, Resilience & Resource Adequacy
CSolPower:	Have other systems reached 100% decarbonization? There should be others like Hawaii and Vermont and a couple of other states that maybe are planning on it. What are they doing?	Reliability, Resilience & Resource Adequacy
Sandia National Laboratories:	While doing the planning, have you taken into consideration the inertial requirements of the system to maintain frequency security as we replace more conventional generation with renewable resources?	Reliability, Resilience & Resource Adequacy
Sandia National Laboratories:	How do we establish a baseline for portfolio metrics such as the EUE (Expected Unserved Energy), which has	Reliability, Resilience & Resource Adequacy

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	been around for a long time now? If you look at literature that goes back to 1970s, you can see the matrix calculated there. So, there's a lot of literature out there which have used IEEE test systems to calculate the EUE for a lot of systems and a lot of scenarios. Maybe that is something you would want to look at as a starting point for establishing a baseline. And I can help you with that if you want.	
Sandia National Laboratories:	Is storage duration critical? Or is storage volume more important? And what is the cost tradeoff? I would say it depends a little bit on what the application is. Are we trying to farm up wind and solar or are we trying to use it as backup? That's something I would be willing to help with as well.	Reliability, Resilience & Resource Adequacy
Member of the Public:	If we are looking at establishing a baseline level of service or capacity for summer or winter resilience, are there any contractual requirements if greater demand is placed on the West as a whole, such as if Hoover or Glen Canyon Dam are no longer able to supply power? This may, if there are contractual agreements, affect the sizing of systems.	Reliability, Resilience & Resource Adequacy
CSolPower:	[In response to the question about tradeoffs, I would definitely go for carbon-free over .1 LOLE (Loss of Load Expectation). That's just my statement: I would choose that we go carbon-free first. I would rather have one less day of no power, considering all the extreme	Reliability, Resilience & Resource Adequacy

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	weather events that are going to result from carbon emissions.]	
Sandia National Laboratories:	Are you using Monte Carlo simulations with forced outage rates of the resources to run the LOLE models?	Reliability, Resilience & Resource Adequacy
Sandia National Laboratories:	Regarding the distribution of uncertainties, you mentioned that you had book-ended the window of your uncertainties. Are there any? Have you investigated looking outside that window at extreme cases that might not have happened over the past 40 years? That might be an interesting exercise.	Reliability, Resilience & Resource Adequacy
CSolPower:	Have you considered accounting for predicted extreme weather? We know the climate is changing and these extreme events are becoming more common. The weather is definitely getting hotter. Looking backward may not be sufficient to give us a realistic view of what's going to be happening in the next 40 years. Is there any effort to work with NOAA? I'm sure that they have done some modeling as to predicted weather.	Reliability, Resilience & Resource Adequacy
Member of the Public:	Does the [electrification of the larger economy] impact the loss of load probability or the loss of load expectations in any way?	Reliability, Resilience & Resource Adequacy
InterWest Energy Alliance:	Your [example in the presentation] used a 2-hour battery. That doesn't seem to be a good assumption. Why not use a 4-hour battery since those are available now?	Reliability, Resilience & Resource Adequacy

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Brubaker & Associates:	This goes back to the concerns in response to the 2020 IRP. I think the thing to think about is that you are making assumptions about where you're going to be in different timeframes so that you can divide up the synergistic benefits across the different resource types. Is this in any way directing an outcome and the economic optimization that will take place later? And what might be revealed is if you start going a different direction in the optimization, then you are assuming where to balance and what the resources are going to be.	Reliability, Resilience & Resource Adequacy
Brubaker & Associates:	You might have to potentially look at both LOLE and EUE. This raises a question: Which is more constraining? The other thing that comes to mind is that it may be that EUE is a better metric than LOLE when it's looked at more carefully; It more optimally identifies how much capacity you need to get a certain level of reliability or for more broadly, resilience.	Reliability, Resilience & Resource Adequacy
CSolPower:	Does this particular graph (Slide #18) relate to battery penetration in megawatts? How does that relate to the percentage of the capacity of the system? Or it's related to solar and wind?	Reliability, Resilience & Resource Adequacy
CSolPower:	This battery penetration is assuming it's all lithium-ion batteries, and you're stating that it's 4-hour capacity. Are you	Reliability, Resilience & Resource Adequacy

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	going to include other studies on other energy storage methodologies or technologies?	
CSolPower:	Does FERC have any standards for utility?	Reliability, Resilience & Resource Adequacy
Member of the Public:	Will PNM consider scenarios for electrification of the economy beyond cars by 2040?	Grid Mod
Member of the Public:	As we get distributed generation coming on in small pocket areas or micro grids, what happens when you have little pockets spread throughout the system? How do we get that to feed back into the system? How do we begin to understand that? What are some of the factors we should be looking for or where we should be looking for data when we may not have much of it in the PNM service area?	Grid Mod
CSolPower:	I just wanted to make sure that you're going to go over the storage requirements that you were looking for. [I'm seeing] 5-hour with 500 megawatts, and I would like to know how often that's expected. [Perhaps it was related to an RFI.]	IRP Report
CSolPower:	Can PNM consider if we are asked to go carbon free before 2040, or 2033 or 2030?	Modeling

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Sandia National Laboratories:	How are you modeling the solar modeling and wind profiles for all the scenarios?	Modeling
Sandia National Laboratories:	Let's say you're using 100 samples for your simulation. So, for each sample, how are you varying the uncertainty? Are you varying the profiles? Are you considering the extreme scenarios for renewables?	Modeling
CSolPower:	Will the [scenario] form include different scenarios? And what kind of variables can we throw in there?	Modeling

All IRP questions and answers can be found here.

The latest future meeting schedule can be found here.

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