LADWP Power Strategic Long-Term Resource Plan (SLTRP)

Advisory Group (AG): Meeting #8

Thursday, April 28, 2022
10:00 am – 12:00 pm
Zoom Platform (Virtual)

Meeting Summary (Draft)[1]

Attendees:

Advisory Group Members/Observers:

1. Brattle, Bruce Tsuchida
2. California Energy Storage Alliance (CESA), Jin Noh
3. California Energy Storage Alliance (CESA), Sergio Dueñas
4. California State University, Northridge (CSUN), Loraine Lundquist
5. City of Los Angeles - Council District 05, Councilmember Paul Koretz, Andy Shrader
6. City of Los Angeles - Office of the Chief Legislative Analyst, Blayne Sutton-Wills
7. City of Los Angeles - Office of the City Administrative Officer (CAO), Sarai Bhaga
8. City of Los Angeles - Office of the City Attorney, Priscila Kasha
9. City of Los Angeles - Office of the Mayor, Paul Lee
10. City of Los Angeles - Office of the Mayor, Rebecca Rasmussen
11. City of Los Angeles - Office of Public Accountability (OPA), Camden Collins
12. City of Los Angeles - Office of Public Accountability (OPA), Frederick Pickel
13. Food & Water Watch (FWW), Jasmin Vargas
14. LADWP Advocacy Committee, Jack Humphreville
15. LADWP Memorandum of Understanding Oversight Committee, Tony Wilkinson
16. Pacoima Beautiful, Annakaren Ramirez
17. Pacoima Beautiful, Veronica Padilla
18. Port of Los Angeles (POLA), Carlos Baldenegro
19. Sierra Club, Katie Ramsey
20. Sierra Club, Teresa Cheng
21. University of California, Los Angeles (UCLA), Nurit Katz
22. University of Southern California (USC), Zelinda Welch
23. Valley Industry Commerce Association (VICA), Sara Garfiinkle
24. Water and Power Associates, Bill Engels
25. Water and Power Associates, William Barlak
26. Kate Unger
27. Maia Leroy
28. Pedro Sanchez
29. VJ Atavane

[1] This summary, prepared to the best ability of the notetakers, is provided as synopsis of the meeting for review of topics covered, and is not intended to represent an official record or transcript of all matters presented or discussed.

LADWP Staff:

1. Stephanie Spicer
2. Crystal Faith Angelo
3. Fredy Ceja
4. April Kaloumaira
5. David Rahimian
6. William Kysella
7. Emil Abdelshehid
8. James Barner
9. David Castro
10. Kai Choi
11. Pjoy Chua
12. Jonathon Flores
13. Paul Habib
14. Hassan Motallebi
15. Robert Hodel
16. Matt Hone
17. Zaw Htin
18. Carlos Jimenez
19. Jimmy Lin
20. Reiko Kerr
21. Leilani J Johnson
22. Kenneth Leung
23. John Levy
24. Jay L Lim
25. Christopher J Lynn
26. Mukund Nair
27. Javier Noriega
28. Norman Cahill
29. Linda Novoa
30. Mark Padilla
31. Bernardo Perez
32. Jason Rondou
33. Nermina Rucic
34. Stephen M. Ruiz
35. Marlon Santa Cruz
36. Faranak Sarbaz
37. Nancy Sutley
38. Jonathan Tang
39. Eric Taylor
40. Louis Ting
41. Carol Tucker
42. Kodi Uzomah
43. Julie Van Wagner
44. Andrea Villarin
45. Jesse Vismonte
46. Winifred Yancy
47. Lisa Yin

48. Lister Yu
49. Vincent Zabukovec
50. Haik Movsesian
51. Aung Win
52. Luke Sun
53. Luis Martinez

Project Team:

1. Alyson Scurlock, Kearns & West (Polling)
2. Joan Isaacson, Kearns & West (Facilitator)
3. Megan Day, National Renewable Energy Laboratory (NREL)
4. Zach Brode, Ascend Analytics
5. Tamar Moss, Ascend Analytics

Note: The meeting presentation slides are posted at ladwp.com/sltrp.

1. Welcome and Introductions

- Joan Isaacson, meeting facilitator from Kearns & West, welcomed the Advisory Group (AG) to AG Meeting #8.

2. Meeting Purpose and Agenda Overview

- Reiko Kerr, LADWP Assistant General Manager of Power Engineering and Technical Services, opened the meeting and welcomed back the AG, informing them that today LADWP would be presenting preliminary SLTRP draft modeling results. Kerr also referenced parallel efforts ongoing via the two-year LA100 Equity Strategies, which aims to ensure the path to 100% carbon-free energy is equitable and inclusive.

- Isaacson gave an overview of AG protocols and responsibilities

3. 2022 SLTRP Overview and Refinements

- Jay Lim, LADWP Manager of Resource Planning, gave an overview on SLTRP updates, expressing excitement to reconvene the AG after having covered seven meetings and over 20 presentations under the current process.

- Lim highlighted recent LADWP clean energy accomplishments such as beating the state by 14 years in reaching the 2030 target to reduce greenhouse gas (GHG) emissions 40% below 1990 levels, and in 2021, achieving a power supply that provided approximately 36.4% of energy from renewables, a number that increases to 55% clean energy when also including large hydro and nuclear resources in addition to renewables.

- Other notable accomplishments include: commissioning of the Red Cloud Wind project, which at 331 MW is the largest, most efficient, and lowest-cost wind resource in LADWP's renewable energy portfolio to date; achievements in the distributed energy resources sector through an expansion of the Feed-in Tarrif (FiT) program by 300 MW, with a 10 MW FiT+ pilot allocation for optional energy storage; assisting the City of Los Angeles in surpassing its goal of installing 10,000 commercial electric vehicle (EV) chargers 20 months ahead of its 2022 target, earning the designation #1 EV-friendly city by Plug Share; and replacing over 20,000 poles, 70,000 crossarms, 330 miles of cables, and 8,400 transformers since 2013.

- Discussing the power system at large, Lim emphasized LADWP's status as the largest municipal utility in the United States, with approximately 1.5 million power customers, energy sales of about 22.5 million MWh in 2021, an operating budget of about $4.3 billion, and current transmission resources that comprise approximately 25% of the state's transmission.

- As part of the LA100 Next Steps, Lim explained that the Red Cloud Wind project, as well as the signed Eland Solar + Storage project, in conjunction with 550 MW of local solar in-service, and other planned projects, are putting LADWP on the path to achieve a goal of 80% renewable energy by 2030. With respect to transmission, projects such as Toluca to Hollywood Line 1 and Tarzana to Olympic Line 1 are undergoing the permitting process with ongoing bi-weekly implementation meetings. For local generation, external funding opportunities for green hydrogen are being explored upon receipt of the green hydrogen request for information responses, and planned projects for Scattergood hydrogen capacity and Haynes recycled water cooling are in progress. For energy storage, 333 MW of energy storage will either have been installed or contracted for by 2023, much of it leveraging the solar + storage federal investment tax credits, and conceptual plans are underway for energy storage at Scattergood. On the equity and distributed energy resources front, the LA100 Equity Strategies effort is ongoing through 2023, and the Feed-in Tariff program was expanded by 300 MW (from 150 MW to now 450 MW), in addition to the launch of a demand response thermostat program, and the advertisement of a distributed energy resource (DER) request for proposal.

- Transitioning to an overview of the 2022 SLTRP, Lim explained how the SLTRP is a roadmap to meet L.A.'s future energy needs and regulatory mandates while maintaining reliable service and reducing emissions in a cost-effective manner. The 2022 SLTRP aims to develop a recommended case that guides near-term actions to achieve a 100% carbon-free energy supply by 2035, and through 2045. Supporting the 2022 SLTRP will be the Integrated Human Resources Plan, as well as risk assessments for implementation and constructability, procurement, operations and maintenance, as well as supply chain.

- In terms of schedule for the 2022 SLTRP, preliminary modeling results for the core scenarios will be presented today at AG Meeting #8, and price sensitivities, as well as "What-if" sensitivities are scheduled to be conducted through the end of June. Subsequently, modeling results will feed into a local air quality and health impact analysis that will be assisted by the National Renewable Energy Laboratory (NREL), and then the team will conduct public workshops throughout the summer and final modeling runs into the fall, with the goal of issuing the final 2022 SLTRP in September 2022.

- With respect to feedback, Lim shared common categories and themes the SLTRP team has received feedback on such as only modeling scenarios that meet the 100% carbon-free by 2035 target, including a "no in-basin combustion" scenario with long-duration energy storage, understanding the customer costs to fuel switch and electrify, explore low load sensitivities and evaluate emerging technologies, as well as study local air quality impacts to ensure environmental justice. In response, all of LADWP's scenarios comply with the City Council motion for 100% carbon-free by 2035, "What-if" sensitivities will be conducted, and thorough presentations have been given on topics of interest such as long-duration energy storage technologies. The SLTRP will also evaluate average costs and rates at a high-level, as well as develop a process for technology scouting and innovation assessment, conduct a low load sensitivity, and perform an air quality and health impacts analysis with NREL.

- Lim proceeded to give an overview of the SLTRP scenarios, including three core scenarios with a target of reaching 100% carbon-free by 2035 as directed by the Los Angeles City Council, as well as a reference SB 100 case that adheres to state mandates to meet a 60% renewable portfolio standard (RPS) by 2030, and ensure that 100% of retail electric sales are met through clean energy resources, inclusive of nuclear and large hydro, by 2045. Among the 100% carbon-free by 2035 scenarios, the main differentiators are that Case 1 reaches an 80% RPS by 2030, whereas Case 2 and 3 reach a 90% RPS by 2030. Also, all three scenarios have increasing levels of distributed energy resources such as distributed solar, distributed energy storage, energy efficiency, demand response, as well as varying levels of building electrification, such that Case 1 and 2 have "High" levels, and Case 3 has the "Highest" levels.

- In addition to modeling of the "Core" scenarios, Lim explained how the SLTRP analysis will also include price sensitivities, looking at the effect of high and low commodity prices for fuel, greenhouse gas allowances, renewable energy, and energy storage. Subsequently, the SLTRP will explore "What-if" sensitivities that include modeling alternatives for no in-basin combustion via green hydrogen fuel cells in place of green hydrogen turbines, observing impacts to the power system if customer adoption results in only meeting half of the demand response capacity targets, as well as studying the effect of transmission upgrade delays, and both high and low load sensitivities.

- Additionally, Lim explained how the 2022 SLTRP aims to include several refinements over the LA100 Study including distribution costs, electric vehicle charging, and updates to the load. On the distribution side, the SLTRP will include the estimated costs required to upgrade the distribution system to alleviate overloads, accommodate load growth, and allow more adoption of distributed energy resources, something not captured in the LA100 Study cost assessments. Included in this will be costs from the Power System Reliability Program (PSRP), which invests more than $1 billion per year to rebuild aging infrastructure and conduct proactive maintenance. Additionally, SLTRP modeling will assume a gradual shift in electric vehicle charging to alleviate stress on the system, starting with unmanaged charging in 2022 and ending in 75% managed charging by the end of the study. Furthermore, the SLTRP will include the most recent load forecast from the LADWP Load Forecasting Group, which incorporates additional energy savings from energy efficiency and distributed solar programs, and predicts lower overall customer demand over the first several years of the modeling horizon, as the LA100 Study showed load forecasts that were approximately 20% higher than LADWP's load today. Given load is one of the greatest factors in resource planning, it inherently impacts rates and resource builds. Over the long term, the SLTRP load will also include medium-duty and heavy-duty electric vehicles, something not considered in the LA100 Study. However, despite the SLTRP having lower net energy for load (NEL) forecast in the earlier years than the LA100 Study, the SLTRP will have a comparable peak load (MW) demand to the LA100 study, which is a significant driver for capacity needs.

- <u>Major Themes from Advisory Group Member Discussion and Questions</u>
  - What accounts for the difference between 55% clean energy and 36% renewables?
    - *A: Clean energy includes large hydro and nuclear generation, in addition to renewable such as solar, wind, geothermal and small hydro. The "renewables" designation alone, does not include large hydro and nuclear generation.*
  - What are the projected average rates? Determining tiers is difficult.
    - *A: This is very complex and it requires us to work with the Financial Services Organization to properly account for many different metrics that are important such as borrowing rations, cash-on-hand, and others. We will be working closely with FSO to study this and will focus on a higher-level look at average rates. Modeling results will also show bulk power costs from a net present value standpoint.*
  - Environmental justice should be number one on the list of priorities, in order to protect Angelenos first, not last like an afterthought.
    - *A: Environmental justice is a very important priority and consideration for us, and we will be documenting this. The SLTRP team is following the LA100 Equity Strategy efforts and will incorporate recommendations when they are available.*
  - As a low-income customer in the northeastern San Fernando Valley, I agree on protecting Angelinos first, in particular low-income rate payers.
  - Are hydrogen fuel cells the only modeling proxy for non-combustion long-duration capacity?
  - I thought that as an outcome of the LA100 Study, we would have a basket of options across four scenarios, from which the City would choose based on different considerations including costs. It appears instead that the SLTRP is being instructed to use the most expensive and most aggressive scenario without regard to providing the costs for those decisions. I am concerned that we do not know the deltas in cost between 2035 and 2045. We should really add this for the policy makers so they can see the true costs first before making policy decisions.
    - *A: We have modeled the SB 100 reference case, and the results will be shown later for bulk power costs, from a net present value perspective.*
  - For the no in-basin combustion sensitivity, are you taking a technology specific approach, and if you are modeling green hydrogen fuel cells, how will you obtain the hydrogen? We shared strategies before on how to remain technology neutral.
    - *A: As we look at in-basin capacity needs, we do realize we have different constraints as to what we can build at our generating station locations, and see hydrogen fuel cells as a resource that can be comparable to hydrogen turbines, from the perspective of operating parameters. We are tracking costs and technologies on an ongoing basis, to further inform different strategies.*
  - For the highest distributed energy resource (DER) scenario, how is the modeling

performed? Is LADWP exogenously assuming different DER levels, or is it endogenously optimized similar to how NREL's dGEN model picked DERs as an option?
  - *A: For the SLTRP, we are focused on bulk power modeling and do not conduct detailed modeling down to the distribution level. We reached out to our DER team and developed a scenario that achieves high DER deployment, and although we have challenges with deploying such a large quantity of DERs in the short-term based on customer adoption, we see that we can improve in the future over the longer term, and expect that our local resources will ramp up. In the highest scenario, we asked our DER team what it would take to max out DER penetration, and we hardcoded these numbers into our capacity expansion model.*
- Are there any participants that represent commercial and industrial customers who consume 60% of the City's electricity, and employ millions of Angelenos? What rate breaks do those commercial and industrial customers get on their energy costs, compared to residents?
  - *A: The 2022 SLTRP roster is in the presentation PDF from the Kick-off Meeting on Sept 23, 2021. We can extract and post separately in the Advisory Group tab.*
- I think there is a factual misunderstanding about the air quality impacts of in-basin combustion generation. Even with natural gas, the air quality impact from all four generation stations is trivial, when compared to emissions from the transportation sector. The perception of significantly bad air impacts from generating stations is being used as a hammer to drive green energy. The real solution lies in transitioning the transportation sector to cleaner fuel sources.
- In the highest distributed energy resource (DER) scenario, are you assuming that you are maxing out the existing distribution infrastructure, or is the "highest" achieved by allowing for distribution upgrades?
  - *A: The highest DER scenario is commensurate with the level of DER resource deployments, more so than distribution upgrades. Even in our moderate DER scenario, we surpass the existing hosting capacity of the distribution system. This happens in different areas of the city, depending on where the interconnections are at. Planners and engineers come up with mitigation solutions including upgrades such as voltage regulator replacements. Power System Reliability Program (PSRP) costs will account for most of this. Furthermore, management of DERs such as electric vehicle charging, will reduce demand peaks. Unmanaged charging will have significant impacts on the distribution system and will require a much larger asset buildout.*

4. 2022 SLTRP Preliminary Results

- To go over preliminary modeling results, Lim introduced Zach Brode, Senior Energy Analyst with Ascend Analytics, a software and energy planning consultant who is conducting modeling for the 2022 SLTRP. Lim explained that as the penetration of renewable energy on the power system increases, there is need to incorporate more robust tools that go beyond the deterministic hourly simulation models that have been traditionally used for integrated resource planning. To assist in this regard, Ascend Analytics offers a suite of stochastic modeling capabilities that can help with critical reliability analysis such as resource adequacy and loss of load expectation (LOLE), among others, very similar to those used during the LA100 study.

- Brode explained that today's preliminary results would focus on two types of modeling: capacity expansion modeling (CEM) and production cost modeling (PCM). First, capacity expansion modeling is performed, which shows how many resources need to be built, where they should be built, and in what sequence, in order to meet constraints such as greenhouse gas emissions and renewable energy targets. Then, production cost modeling follows, which consists of taking the resource buildout prescribed by capacity expansion modeling, and running it through a power system economic dispatch simulation at the hourly level of granularity. The results of production cost modeling give insight into metrics such as the amount of emissions, variable production costs (fuel, emissions, variable operations and maintenance) to operate the system, and renewable energy curtailment, among others. In addition to refining ongoing modeling, Brode explained that subsequent modeling steps include resource adequacy and loss of load expectation analysis for reliability, price and what-if sensitivities, as well as a resiliency study to simulate power system operations during extreme weather event conditions such as a wildfire.

- After reviewing the inputs to the three carbon-free scenarios being modeled, in addition to the SB 100 reference case, Brode revealed preliminary results.

- In terms of capacity buildouts, the SB 100 case appeared to be comprised of slightly below 15 GW of total resource capacity by 2045. New resources were predominantly solar + storage (cheapest resource) and wind, in addition to some standalone storage up to 12 hours in duration. Natural gas resources were retained through 2045 as the SB 100 goal for 100% clean energy by 2045 is with respect to retail electric sales, and permits the use of natural gas resources to make up transmission and distribution losses.

- Case 1 appeared to be comprised of approximately 20 GW of total resources by 2045, with a substantial amount of new 8-hour storage and new long-duration renewable capacity (such as geothermal, firm and shaped wind, among others), above and beyond that shown in the SB 100 case. In addition, this scenario showed significant builds of in-basin green hydrogen capacity at the current generating station locations, for purposes of retaining reliability and resiliency.

- Case 2 and 3 buildouts were very similar to those of Case 1, comprised of approximately 20 GW of total resource capacity by 2045, with a substantial amount of new 8-hour storage, new long-duration renewable capacity (such as geothermal, firm and shaped wind, among others), and in-basin green hydrogen capacity for reliability and resiliency. In the near term, Case 2 and 3 had more renewable resources by 2030 than Case 1, as Case 2 and 3 have a target of a 90% renewable portfolio standard by 2030a, as opposed to the 80% target for Case 1. Additionally, Cases 2 and 3 had higher levels of distributed energy resources compared to Case 1, but they did not make a significant difference in offsetting bulk resource capacity builds.

- With respect to energy generated, in the SB 100 case, LADWP appears to be far beyond the required amount of renewable generation, with approximately 50% of the energy coming from solar + storage. For Cases 1, 2, and 3, the interim 2030 targets and the 100% carbon-free by 2035 target result in LADWP generating energy from renewables substantially above what is required to meet 100% of retail sales. The takeaway for the carbon-free scenarios is that there is a much heavier reliance on firm generation, mainly long duration renewable capacity. While solar + storage is a low-cost resource, it is not providing sufficient energy when the sun is down, thus the model is relying much more on energy resources that are available after the sun has set. Across scenarios and the study horizon, approximately 80% to 90% of energy associated with green hydrogen was coming from the Intermountain Power Project, with the small remainder attributed to in-basin generation units.

- With respect to projected carbon emissions, Case 2 and 3 appear to have slightly lower emissions than Case 1, and SB 100 emissions appear to remain fairly constant towards the later years in the study, due to natural gas capacity being available as a resource when sufficient clean energy is not available to serve load.

- In terms of renewable curtailments, on a preliminary basis, Case 3 appears to have the greatest amount of curtailment as a percentage of load, reaching a maximum of up to 25% in the early 2040s. Case 2 has the second largest curtailment figures reaching almost 10% of load in the late 2030s, and Case 1 curtailment appears to peak at about 5% of load in the 2040s.

- With respect to cost, Cases 1, 2, and 3, with their more stringent target of 100% carbon-free by 2035, have larger portfolio costs than the SB 100 compliance case by about $15 billion to $20 billion on a net present value basis, from 2022-2045. Among the carbon-free scenarios, Case 1 has slightly lower portfolio costs than Case 2, and Case 2 and Case 3 are approximately level. Case 3 appears to potentially have slightly lower costs for LADWP due to implied shifting of costs onto customers as a result of assuming extremely high levels of distributed energy resources such as distributed solar and distributed energy storage, among others.

- When defined relative to the SB 100 case, carbon reductions come at a substantial additional cost to the LADWP system. In 2030, the cost per metric ton of emission reductions for Cases 1, 2, and 3, relative to SB 100, appear to be about $1,800/metric ton, $2,500/metric ton, and $3,800/metric ton, respectively. In the year of 100% carbon-free compliance five years later, the carbon-free scenarios appear to reach a cost of almost $9,000/metric ton above and beyond the SB 100 reference case.

- In summary, Brode explained that all three carbon-free scenarios have very similar capacity buildouts in the early years, and all scenarios rely heavily on solar + storage for energy, as well as standalone storage for capacity. Furthermore, in order to maintain reliability, all carbon-free scenarios require dispatchable and firm generation, and rely heavily on generation from long-duration renewables that is available during the hours after the sun has set. Lastly, the planning and procurement cycle will give LADWP an opportunity to reassess the least cost and most reliable path as new technologies become commercially viable. Case 1 could prove advantageous if technology improvements are slower than expected, while Case 2 and 3 could be advantageous if technology improves faster than expected, with the difference between Case 2 and 3 showing insight into the cost and value of higher penetrations of distributed energy resources.

- <u>Major Themes from Advisory Group Member Discussion and Questions</u>
  - I hope the transmission constraints for geothermal and hydro are reasonable. That would then highlight the true reliability impact of being unable to secure adequate baseload resources to offset absence of renewables during an extended outage.
  - Is there any update on the timeline and availability of green hydrogen for major self-generators in the basin?
    - *A: Our planning teams are actively tracking technology maturity and development of green hydrogen turbines. Manufacturers are mostly capable of 30% hydrogen by volume today, and many are pushing for a roadmap to get to 100% in the 2030s.*
  - How can "Peak Load" (black dashed line) fall so far below capacity? This is not intuitive.
    - *A: The peak load shown on the charts is the 1-in-10 peak load, while the capacity shown is nameplate capacity of the resources. We have to overbuild our resources for the carbon-free scenarios, as many of the renewables have a dependable capacity or effective load carrying capability over the peak hours of the year, that is much lower than their stated nameplate capacity.*
  - Can you provide clarity on the assumptions behind new 4-, 8-, and 12-hr storage? What is the round-trip efficiency? Can this model optimize duration and capacity separately? What are the costs?
    - *A: The 4- hour storage is a proxy for a resource such as a lithium ion battery, the 8-hour storage could represent a flow battery or mid-duration energy storage asset, whereas 12-hour storage could be long-duration storage such as pumped hydro or compressed air. Our request for proposals will inform which technologies could fit our needs. Furthermore, we have different cost assumptions for the various types of storage due to economies of scale.*
  - Have you heard anything about availability of green hydrogen to customers with plants , in addition to LADWP plants? Our plant would have the ability to utilize hydrogen but we are interested in the availability timeline.
    - *A: Green hydrogen availability is currently being explored and we are reviewing responses to the request for information.*
  - Cases 2 and 3 appear to force LADWP to lead the market by producing its own green hydrogen at a high cost. The better choice would be Case 1 and in addition, retaining natural gas for in-basin generation until commercial green hydrogen is available.
  - Does the curtailment forecast account for any assumptions for increase in energy efficiency measures? It might increase even more with higher energy efficiency.
  - Costs for solar panels are increasing due to supply chain and geopolitics, and they may be even higher than assumed in this analysis.
  - What will average customer bills be in the future (not just rates)?
    - *A: In the 2017 SLTRP, not only did we have an average rate forecast, but we also translated it into an estimated average bill. We looked at an*

average downtown Los Angeles customer consuming about 300 kWh/mo. versus a Valley customer consuming 700 kWh/mo. We will be working with the Financial Services Organization to obtain a high-level estimate for average rates and impact to average customer bill.

- What do you see here and in other studies in terms of tradeoffs for carbon reduction?
  - *A (Zach): That is a very location specific question – in L.A. you have the opportunity to reduce carbon via the transportation sector, as it is very large. You will see a lot lower cost for carbon reduction from such sectors in comparison to trying to get to a 100% carbon-free energy supply.*
- The Federal standard for carbon reduction now is about $50/metric ton, which is much less than the $1000/metric ton that you are talking about right now, and there are carbon reduction markets for methane and others. I think we are pushing hard in the wrong place and wonder what we can do in other economy sectors.
  - *A: In the past, LADWP has included incentives for transportation electrification and calculated a multiplier effect for transportation electrification expenditures versus trying to reduce the last 5-10% of our power system emissions. We will be reiterating that in our SLTRP and that will be compounded due to our even more aggressive goals.*
- Thanks, it is important to emphasize that. Back then, we looked at getting the Intermountain Power Project (IPP) off of coal at approximately $50/metric ton, and green hydrogen will probably cost more but it does have great storage potential.
- On the Intermountain Power Project (IPP), is there an update on the timeline to transitioning that facility to 100% green hydrogen?
  - *A: For the intents and purposes of modeling, we have to make optimistic assumptions and assumes IPP gets to 100% green hydrogen by 2035 to comply with the carbon-free scenario constraints. The IPP team would have more information on the actual details.*

5. Discussion, Q&A, and Polling

- Upon the preliminary results presentation, Lim expressed LADWP's intent to get feedback from the AG on next steps and run the modeling sensitivities. Feedback included but was not limited to:

  - Strongly support Case 3 as long as SB 100 is maintained for comparison
  - Do we not have the option to choose all scenarios? I don't think streamlining should be prioritized at the risk of full participation and transparency to the AG and the public.
    - *A: We were considering running the sensitivity on only one scenario due to the similarities, but we will consider the feedback.*
  - Case 2, as no need to take NREL's Early and No Biofuels (Case 3) as presented in the LA100 Study. The SLTRP team should be free to make modifications with options from Cases 2 and 3 if the team thinks they are an

improvement.

- Case 1 is the best for sensitivities, as it is similar to Case 2. Case 3 is too extreme.
    - *A (Zach): Case 2 may provide insights into the highest cost range as it has the cost to LADWP.*
- For the what-if scenarios, there is special value in applying those to all of the scenarios because it would highlight some of the tradeoffs and differences between them. The DER sensitivity in particular is important to compare between the scenarios. Picking just one run for the pricing sensitivities seems fair.
- Agree that Case 3 is too extreme. However I think LADWP has been told to use Case 3. I would choose Case 2 if it means avoiding the assumptions that customers pay the costs for Case 3.
- Case 3 would be the best to describe the cost adjustments to customers, as it is us the customers who are choosing a case.
- If you can only run one model for the no in-basin combustion sensitivity, I recommend running that on Case 3 because it is the closest of the three scenarios to minimizing combustion, so that would show the incremental costs/benefits of having no combustion at all.
- I'm supportive of Case 3
    - *A: We also have an email set up for submitting feedback at powerSLTRP@ladwp.com*
- Whether Case 1 , 2 or 3 are used for sensitivities, some sensitivities should be done on the SB 100 reference case to show how risks change. Very important.

6. 2022 SLTRP Public Outreach Meetings

- Stephanie Spicer, LADWP Manager of Community Affairs, gave an overview of the format and content that is being planned for the 2022 SLTRP public outreach meetings.

- The plan is to have three public outreach meetings, tentatively planned for August, that will take place virtually. The topics for these meetings will include a power system overview, 2022 SLTRP preliminary and sensitivity modeling results, as well as a question and answers session, discussion, and polling. Each meeting will also have translation to Spanish available.

- Major Themes from Advisory Group Member Discussion and Questions
    - It is critical to make the slides available to participants in advance; there is a ton of content in today's slides that community participants will want to understand so they can prepare questions in advance and engage better at those meetings.
    - I agree that air quality (and projected improvements between scenarios) is likely to be an area of community interest.
    - Not shown on the screen is a truly simplified understanding of how the power system is being changed with green energy, the time sensitivity of solar and wind, and the need for baseload energy. Earlier there was mention about air quality - is that really related to emissions from in-basin power generation or emissions from transportation? Whatever you put together in terms of a draft

presentation, if you can send it by email to the AG, we can send comments back to Stephanie and team.

7. Wrap Up and Next Steps

- In conclusion, Lim and the Project team thanked the AG for their valuable feedback and encouraged submissions to the powerSLTRP@ladwp.com email address to communicate additional feedback if desired. The Project team will review feedback and submissions, and evaluate options for conducting price and what-if sensitivities to show results at the next meeting.

Next Meeting: June 2022 (tentative; to be confirmed)