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Subject: CESA's Comments on the Draft 2022 Strategic Long Term Resource Plan

Re: CESA's Comments on the Draft 2022 Strategic Long Term Resource Plan

Dear LADWP SLTRP Team:

The California Energy Storage Alliance (CESA) continues to appreciate the opportunity to participate in the Los Angeles Department of Water and Power's (LADWP) Strategic Long-Term Resource Plan (SLTRP) Advisory Group (AG) and offer our unique insights to help LADWP conduct supplementary modeling and identify the no-regrets investments and actions that can be taken to further the city's goals and requirements. CESA commends the SLTRP Team's comprehensive effort in developing a long-term resource plan that strives to attain the City of Los Angeles' ambitious environmental goals while achieving reliability and is thankful for having been an active stakeholder along the way.

Recognizing the significant effort that went into the development of the Draft 2022 SLTRP, CESA's comments focus on key considerations and revisions for the next 2023 SLTRP cycle. Our focus and recommendations going forward derive from: stakeholders engaging in the Advisory Group (AG) processes for the LA100 Study and SLTRP, the changing and evolving market conditions as it relates to the Inflation Reduction Act (IRA) in 2022, the significant federal and state funds made available through the Infrastructure Investment and Jobs Act (IIJA) in 2021, as well as the passage of various clean energy bills in California (*e.g.*, Assembly Bill 205, Senate Bill 179). These federal and state developments may significantly impact the costs of a range of clean generation and storage resources at both utility scales and for individual customers, such that the 2023 SLTRP cycle would be the best time and place to incorporate these changes in the modeling analyses. As the Draft 2022 SLTRP recognizes,[1] there was no consideration of these changes given the timing of these developments at the later stages of the SLTRP modeling, but LADWP also fully acknowledges the numerous assumptions and implementation risks embodied in its recommended Case 1.

Fortunately, LADWP has the next SLTRP cycle planned for 2023, which affords an opportunity to incorporate the many policy changes in the next round of modeling analyses and in developing a more robust implementation plan. With the Draft 2022 SLTRP also providing much more documentation on key inputs and assumptions as compared to what has been made available to date via summary or higher-level presentation slides during the AG meetings, CESA and other stakeholders are better positioned to provide technical input and feedback

Taking the above into account, CESA's feedback and recommendations can be summarized as follows:

- CESA supports next year's 2023 SLTRP process conducting a deeper dive into an assessment of emerging technologies and forming a more diversified portfolio to maximize reliability, minimize in-basin combustion, and mitigate implementation risks.
- The AG for the 2023 SLTRP process should be provided with technical documentation in advance to better prepare for meetings and shape the inputs and assumptions.

COMMENTS

1. **CESA supports next year's 2023 SLTRP process conduct a deeper dive into an assessment of emerging technologies and forming a more diversified portfolio maximize reliability, minimize in-basin combustion and mitigate implementation risks.**

[1] LADWP Draft 2022 SLTRP, Page ES-29 and ES-39.

LAWDP staff created several cases to achieve 100% carbon free energy, pursuant to the Los Angeles City Council motion establishing the accelerated goal for all the electricity to come from zero-carbon energy by 2035.[2] After extensive stakeholder input through the AG process, LADWP staff decided to model four cases, meant to highlight the type of investments needed to achieve the 100% carbon free energy goal:

- *SB 100/Reference Case*: 60% RPS by 2030, 100% clean energy by 2045
- *Case 1*: 80% RPS by 2030, 100% carbon free by 2035
- *Case 2*: 90% RPS by 2030 with focus on large scale renewables, 100% carbon free by 2035
    - 5,000 MW of behind-the-meter and distributed resources by 2045
- *Case 3*: 90% RPS by 2030 with focus on distributed energy resources,100% carbon free by 2035
    - 7,000 MW of behind-the-meter and distributed resources by 2045

As explained in the Draft SLTRP, staff found that, to ensure reliability of the grid, there is a need for firm and dispatchable generation with the LA Basin. Stakeholder feedback led staff to discuss a "No In-Basin Combustion" case as well. Unfortunately, the study for this scenario was narrow and flawed. Staff did not build upon the "No-Combustion" sensitivity explored by the National Renewable Energy Laboratory (NREL) within the LA100 Study, but merely substituted the means of utilization of green hydrogen from combustion turbines to fuel cells,[3] concluding that a No In-Basin Combustion scenario was impractical given the cost comparison between fuel cells and thermal capacity. CESA believes this led staff to narrow its focus to one that is uneconomic, restricting the set of solutions to only considering green hydrogen as a viable solution to retaining reliability.

In CESA's view, LADWP staff's recommendation of Case 1 to Executive Management overlooks the variety of distributed energy resources (DERs) and behind-the-

[2] LADWP Draft 2022 SLTRP, Page 52.
[3] AG Meeting #9 Materials, Page 52.

meter (BTM) technologies that could be deployed to support LADWP's decarbonization efforts. Hence, CESA reiterates its support for Case 3 as the recommended case. Case 3 minimizes the potential impacts of loss of load events with some marginal increase in capacity buildout, though the highest net present value portfolio costs – *i.e.*, of the core cases, Case 3 attains the greatest standard of reliability (0.19 Loss of Load Hours for the year 2035).[4] Furthermore, Case 3 attains the same GHG emissions reductions as Case 1 and 2, but at an accelerated pace.[5] For example, by 2031 Case 3 would result in a little of half of the emissions of Case 1 and 2. In addition, despite the higher relative cost of Case 3, the greater reliance on DERs and BTM resources serves as a rational hedge against some of the uncertainties of hydrogen blending and fueling of the in-basin generation facilities.[6] Plus, with the passage of the IRA, there is potential for the deployment costs of DERs and BTM resources to possibly be lower than was initially modeled,[7] making it potentially a more cost-competitive portfolio. By targeting DERs and BTM resources for adoption by low-income customers and disadvantaged communities, Case 3 has the added advantage of advancing the LA100 Equity Strategies, as well as capturing a greater portion of the IRA tax credits, which have adders for these specific customer groups and communities.

Ultimately, CESA recommends optionality and consideration of a more diverse range of solutions that can address in-basin reliability needs, not one that narrowly relies on green hydrogen as the only option. LADWP staff should strive to consider a case that limits the amount of combustion, whether or not it is "green," to minimize the impacts of burning anything in-basin. For the 2023 SLTRP, CESA urges LADWP to more thoroughly consider the benefits of emerging technologies by expanding on the "What If" sensitivity to study more than just hydrogen fuel cells. LADWP must hold themselves accountable to "remain committed to the research, development, and growth of new emerging clean energy sectors."[8] CESA supports LADWP developing a firm, transparent technology

[4] LADWP Draft 2022 SLTRP, Chapter 4 Pages 54 and 61, and Chapter 5 Page 5.
[5] LADWP Draft 2022 SLTRP, Page 38.
[6] Presumably, a maximum DER strategy will reduce in-basin plant capacity factors further, just as how the what-if scenario for reduced demand response resulted in a slight increase in annual plant capacity factors. *See* LADWP Draft 2022 SLTRP, Chapter 4 Page 23.
[7] At the same time, we recognize that IRA tax credits and incentives extend to a wide range of clean generation and storage, efficiency, and electrification technologies, including for green hydrogen production.
[8] LADWP Draft 2022 SLTRP, Page 268.

readiness methodology to ensure there are annual updates to the SLTRP to account for new innovations in the energy sector, such as in long-duration energy storage (LDES).

A deeper examination of emerging technologies such as LDES is warranted, especially as the Draft 2022 SLTRP recognizes the implementation challenges and risks associated with green hydrogen[9] – a strategy that underlies all the Core Cases. Yet, in its consideration of "Alternative Solutions" that reduce the need to develop hydrogen-fueled gas turbines, the report does not mention LDES technologies,[10] which range in capabilities and durations, from the "medium-duration" 8-12 hours to the multi-day or seasonal durations. With LADWP actively soliciting energy storage technologies as part of the rolling Request for Proposals (RFPs) through Southern California Public Power Authority (SCPPA), including specific considerations for LDES solutions,[11] LADWP may receive information on the state of LDES technologies, similar to what was received through the Green Hydrogen Request for Information (RFI) that likely informed technology assumptions for the SLTRP.[12] Furthermore, many announcements have been made about first-of-a-kind commercial project deployments and/or initial pilots or deals with off-takers, and the IRA has been a transformative piece of federal legislation that will drive investments and procurement of LDES technologies – many of which will strive to secure the Section 45X manufacturing tax credit.

Altogether, LDES represents an emerging technology class that will likely offer LADWP with optionality to address their in-basin reliability needs. Combined with the local virtual power plants (VPPs) that can be developed through significant deployment of DERs and BTM resources coordinated through effective programs, LADWP should consider a wider range of alternative solutions, all of which will be spurred and supported through IRA, IIJA, and state programs/funds. Green hydrogen is an important solution that will certainly have a role to play in LADWP's decarbonization goals and strategies, but reliance on this similarly emerging technology/resource class under all Core Cases despite

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[9] LADWP Draft 2022 SLTRP, Chapter 2 Page 66-69.
[10] LADWP Draft 2022 SLTRP, Chapter 2 Page 70.
[11] Appendix B of 2022 SCPPA Standalone Energy Storage RFP.
[12] LADWP Draft 2022 SLTRP, Chapter 2 Page 65.

the implementation risks and challenges highlighted in the Draft 2022 SLTRP would be putting all the eggs in one basket.

2. **The AG for the 2023 SLTRP process should be provided with technical documentation in advance to better prepare for meetings and shape the inputs and assumptions.**

CESA greatly appreciates the invitation and ability to participate in both the LA100 and 2022 SLTRP AG processes, providing critical feedback and input on the modeling approaches, tools, and various inputs and assumptions, especially as it relates to energy storage technologies and capabilities. However, CESA would have benefited greatly from technical documentation as detailed to greater extent in the Draft 2022 SLTRP Report, which explains sources for inputs, forecasting methodologies, specific projects incorporated, among many other considerations. Such breadth and depth of information was lacking during the AG process in CESA's experience, limiting our ability to provide substantial and specific input and feedback until this final stage of the SLTRP process. During the AG meetings, this type of information was presented in higher-level and/or summary slides.

For example, upon review of the Draft 2022 SLTRP, CESA has several questions as to the rationale and specific inputs and assumptions with the in-basin energy storage projects by 2030, which includes flow batteries at the Valley and Scattergood facilities, along with seemingly "generic" LDES at the Beacon II projects in all Core Cases.[13] To our knowledge from the AG meetings, CESA was unaware of this core assumption. While directionally supportive of the inclusion of these resources, CESA would have inquired and requested further information on the assumptions for these resources and whether such LDES resources could have been modeled endogenously in the capacity expansion model in order to understand the value proposition and operational profile of LDES resources of different capabilities (*e.g.*, duration, roundtrip efficiency, charge/discharge rate, ramp rate,, inertia, etc.), which could inform specifications and criteria for procurement activities. Optimizing the capacity expansion modeling of LDES resources in terms of duration

[13] LADWP Draft 2022 SLTRP, Chapter 3 Page 19.

needed could have helped inform the necessary attributes to provide in-basin resiliency that is currently provided by the in-basin generation facilities.

Similarly, the Draft 2022 SLTRP documentation made clearer the underlying assumptions for how green hydrogen would be sourced, produced, and transported to serve in-basin reliability needs in assuming market purchase price of the green hydrogen and "delivery" rather than onsite production and storage, which requires further investigation,[14] suggesting that the green hydrogen may be currently assumed to be trucked in, likely using diesel transport. Many questions are generally raised about the long-term implementation feasibility of green hydrogen-fueled capacity in the LA Basin, especially as the SLTRP explains the space constraints that would preclude production and storage of hydrogen at the generating stations,[15] such that market purchases and delivery is currently being assumed as the long-term approach. If not the case, the SLTRP does not explain the alternative approach (*i.e.*, onsite electrolysis or pipelines), nor any potential costs associated with alternatives (*e.g.*, pipeline buildout or retrofitting, electrolyzer capital costs).

Furthermore, CESA has questions and recommendations as to how BTM resources could be modeled, including the inclusion of commercial thermal energy storage ("TES") resources and how BTM energy storage at large is dispatched and optimized. As CESA understands it, local solar and storage was not optimized endogenously in capacity expansion modeling, instead relying on fixed projections and extrapolations based on LADWP's DER Planning Team, which overlooks the possibility for VPPs to leverage the built environment and provide the in-basin capacity and storage capabilities currently provided by LADWP's generation facilities. Especially as the SLTRP details how local transmission buildout is limited due to the dense urbanization of the city,[16] CESA believes that greater efforts need to be made to develop DER modeling approaches and implementation strategies.

Finally, CESA would request that the 2023 SLTRP cycle more specifically detail the in-basin resiliency need, as well as the capacity and resiliency value of different types

[14] LADWP Draft 2022 SLTRP, Chapter 3 Page 20-21.
[15] LADWP Draft 2022 SLTRP, Chapter 2 Page 67-68.
[16] LADWP Draft 2022 SLTRP, Chapter 2 Page 61.

of energy storage resources. Although the LA100 Study looked more closely at wildfire and transmission outage risks, it is unclear what the resource attributes are to replicate the in-basin generation facilities, currently assumed to be fueled by green hydrogen in the long term. Some data was provided on the duration of outages from recent wildfires (*e.g.*, 12 hours or more, 22 hours in one case with wildfires impacting the Pacific DC Intertie), as well as the role of these in-basin generation facilities in enabling transmission maintenance, buildout, and upgrades as transmission infrastructure is put on outage,[17] but the average or desired performance attributes are not specified to inform alternative solution identification and development. For instance, if the need is for 24 hours of on-call generation or storage supply to address these in-basin resiliency risks, then it could help with the implementation strategy in potentially soliciting for multi-day LDES resources.

To the same end, brief references are made to the use of effective load carrying capability ("ELCC") to capture the reliability contributions of intermittent and energy-limited resources like energy storage,[18] but the marginal ELCC values are not reported, and the methodology is not detailed. Considering the importance of the ELCC methodology and approach in a grid saturated with renewables and energy storage, this should be further discussed in the SLTRP, which could also inform procurement strategies to identify and solicit for the attributes needed to meet LADWP's decarbonization and reliability objectives. The results showed a decent buildout and mix of 8-hour lithium-ion battery storage, along with 4-hour lithium-ion battery storage and utility-scale solar + storage resources,[19] but CESA is unclear on the duration required to achieve 100% ELCC or how the renewable and storage buildout must work in tandem to maximize the ELCC contributions of different development strategies.

In sum, all of the above assumptions, along with many others not mentioned here, warrant further inquiry, investigation, and explanation. The above examples are intended to illustrate how CESA is newly learning about the various and specific inputs and assumptions that went into the SLTRP modeling, which should have been elucidated in the AG process. At this late stage in the 2022 SLTRP process, CESA is instead inclined to pivot

[17] *See, e.g.*, LADWP Draft 2022 SLTRP, Chapter 4 Page 36.
[18] LADWP Draft 2022 SLTRP, Chapter 3 Page 35.
[19] LADWP Draft 2022 SLTRP, Chapter 4 Page 11 and 15.

our focus to the 2023 SLTRP process, presumably just around the corner. With the 2022 SLTRP as a starting point, assuming LADWP will build on this report for further iteration, CESA kindly requests that LADWP provide such detailed technical documentation during the AG process, with updates to reflect the latest policy changes (*e.g.*, IRA, IIJA, state funds) and emerging technology developments. If not all AG members are interested in such technical details, we encourage LADWP to convene a technical sub-group for interested AG members since these technical details will, at the end of the day, drive the modeling outcomes and influence implementation and deployment strategies.

CONCLUSION

CESA appreciates the opportunity to provide these recommendations and hopes they are helpful. Please do not hesitate to reach out if you have any follow-up questions or would like to discuss them further.

Sincerely,

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