# LADWP Power Strategic Long-Term Resource Plan (SLTRP)

## Advisory Group (AG): Meeting #2

**Thursday, September 30, 2021**
**10:00 am – 12:00 pm**
**WebEx Platform (Virtual)**

## Meeting Summary (Draft)[1]

**Attendees:**

**Advisory Group Members/Observers**

1. California Energy Storage Alliance (CESA), Jin Noh
2. California State University, Northridge (CSUN), Loraine Lundquist
3. Center for Energy Efficiency and Renewable Technologies (CEERT), John V. White
4. City of Los Angeles – Climate Emergency Mobilization Office, Marta Segura
5. City of Los Angeles - Council District 02, Councilmember Paul Krekorian, Matt Hale
6. City of Los Angeles - Council District 03, Councilmember Bob Blumenfield, Jeff Jacobberger
7. City of Los Angeles - Council District 05, Councilmember Paul Koretz, Andy Shrader
8. City of Los Angeles - Council District 13, Councilmember Mitch O'Farrell, David Giron
9. City of Los Angeles – Office of the Chief Legislative Analyst, Blayne Sutton-Wills
10. City of Los Angeles – Office of the City Attorney, Priscila Kasha
11. City of Los Angeles – Office of the Mayor, Paul Lee
12. City of Los Angeles – Office of Public Accountability (OPA), Camden Collins
13. City of Los Angeles – Office of Public Accountability (OPA), Frederick Pickel
14. Food and Water Watch, Jasmin Vargas
15. LADWP Memorandum of Understanding Oversight Committee, Tony Wilkinson
16. Los Angeles Business Council (LABC), Arielle Lopez
17. Los Angeles Unified School District (LAUSD), Christos Chrysiliou
18. National Resources Defense Council (NRDC), Amanda Levin
19. Neighborhood Council Sustainability Alliance (NCSA), Dan Kegel
20. Pacoima Beautiful, Veronica Padilla
21. Port of Los Angeles (POLA), Carlos Baldenegro
22. Port of Los Angeles (POLA), Dac Hoang
23. Southern California Public Power Authority, Michael Webster
24. University of Southern California (USC), Zelinda Welch
25. Valero Wilmington Refinery, Brissa Sotelo-Vargas
26. Water and Power Associates, William Barlak
27. Water and Power Associates, Bill Engels
28. Sierra Club, Carlo De La Cruz
29. Celine Hoang

[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. Not all attendees may be reflected due to early log-offs, no self-identification, and other factors.

**LADWP Staff**

1. Stephanie Spicer
2. Vincent Zabukovec
3. Dawn Cotterell
4. Glenn Barry
5. Daniel Beese
6. Scott Briasco
7. Michael Buck
8. Kai Choi
9. Michael D'Andrea
10. Sager Farraj
11. Jonathon Flores
12. Robert P. Gonzalez
13. Aaron Guthrey
14. Jason Hills
15. Robert Hodel
16. Matt Hone
17. Greg Huynh
18. James Barner
19. Carlos Jimenez
20. Jimmy Lin
21. Kitsan Lai
22. John Levy
23. Peter Liang
24. Jay L. Lim
25. Christopher J. Lynn
26. Haik Movsesian
27. Yamen Nanne
28. Ashkan Nassiri
29. Denis Obiang
30. Kevin Peng
31. Bernardo Perez
32. David Rahimian
33. Jason Rondou
34. Nermina Rucic-O'Neill
35. Arash Saidi
36. Armen Saiyan
37. Faranak Sarbaz
38. Steve Ruiz
39. Luke Sun
40. Jonathan Tang
41. Louis Ting
42. Carol L. Tucker
43. Julie Van Wagner
44. Andrea Villarin
45. Jesse Vismonte
46. Aung Win
47. Winifred Yancy
48. Lisa Yin

49. Lister Yu
50. Kent Chan
51. Luis Martinez

**Project Team**

1. Joan Isaacson, Kearns & West (Facilitator)
2. Alyson Scurlock, Kearns & West (Polling)
3. Brady Cowiestoll, National Renewable Energy Laboratory (NREL)
4. Jaquelin Cochran, National Renewable Energy Laboratory (NREL)
5. Paul Denholm, National Renewable Energy Laboratory (NREL)
6. Patricia Romero Lankao, National Renewable Energy Laboratory (NREL)
7. Brandon Mauch, Ascend Analytics
8. Zach Brode, 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 the second meeting for the 2022 LADWP Power Strategic Long-Term Resource Plan. Prior to this meeting, a review of the LA100 Study was presented by NREL, to allow an opportunity for AG members to revisit the important elements and key takeaways.

## 2. Meeting Purpose and Agenda Overview

- Isaacson explained that in this meeting the team would continue to share updates on the many considerations for the SLTRP. This included an LA100 Study Review of Rates by the City of Los Angeles Office of Public Accountability (OPA), LA100 Next Steps by LADWP, and LA100 Study Assumptions relating to the Power System Reliability Program (PSRP) also presented by LADWP.

## 3. LA100 Study Review of Rates (OPA)

- Dr. Frederick Pickel, Ratepayer Advocate and Executive Director of the City of Los Angeles Office of Public Accountability, presented on findings by the Brattle Group, who was commissioned by the OPA to assist in the monitoring and review of the LA100 Study. The final full revision by the Brattle Group is available at opa.lacity.org.

- The focus of the OPA review was to look at power system costs of implementing the LA100 Study scenarios, in five-year increments from 2020-2045, highlighting the importance of accounting for the costs of transportation electrification and building electrification, and capturing the associated infrastructure costs such as system upgrade costs, as opposed to only accounting for the cost of additional power supply to meet electrification load, as was the case in the LA100 Study.

- From a power industry investment and planning standpoint, the OPA emphasized that an organization needs to build now the infrastructure expected to be needed in five years, and that plans need to be finalized now for what an organization hopes to build and contract for in the next 5-10 years, recognizing uncertainty in technologies and planning efforts. The effect of the ongoing COVID-19 pandemic on supply chain issues and their impact on power planning efforts, was also mentioned.

- An overview was given of the four LA100 Study scenarios (SB100, Early & No Biofuels, Transmission Focus, Limited New Transmission), which when each is considered under two different loads (moderate, high), in addition to a stress load sensitivity for the SB100 scenario, results in nine studied options The bookend scenarios were identified to be SB100 moderate load and Early & No Biofuels high load. With respect to loads, moderate assumes modest electrification adoption, high looks at more aggressive electrification and efficiency, and stress looks at aggressive electrification with less improved efficiency.

- With respect to estimated total costs by pathway, it was noted that while costs do not vary much through 2030, they grow exponentially beyond 2030 and tend to diverge by scenarios instead of load levels. By 2045, cumulative costs are expected to reach $67.7 billion +/- $20.5 billion (~30%). While capital expenditures vary by pathway and year observed, the bulk of operating expenses were due to renewable energy power purchase agreements (PPAs). Using the example of SB100 moderate, approximately 20% of the costs were capital expenditures and 80% of the costs were operational expenditures. In terms of renewable power purchase agreement (PPA) procurement, it was noted that the period leading up to the year 2030 was going to be a significantly heavy lift for LADWP.

- With respect to power sector greenhouse gas (GHG) emissions by scenario, the LA100 Study looked at total sector GHG emissions. The most significant GHG emissions reduction occurred in the decade leading up to 2030, with the largest reduction resulting from elimination of coal as part of the generation mix.

- When looking at GHG emissions for power, transportation, and building sectors at large, the benefits of electrification (transportation and buildings) are apparent, resulting in more economy-wide GHG emission reductions at lower incremental costs. Using the SB100 moderate load and high load scenarios as an example, transportation sector GHG emissions drop from ~18 million metric tons (MMT) to ~10 MMT in the moderate load scenario, and ~18 MMT to ~2.5 MMT in the high load scenario, from 2020-2045. While in the year 2045, the power sector emissions are slightly higher in the high load scenario over the moderate load scenario in order to fulfill increased electric demand (~4.1 MMT vs ~2.9 MMT), the economy-wide GHG emissions spanning power, transportation, and building sectors in the high load scenario is nearly half of that in the moderate load scenario (~8 MMT vs ~16 MMT), due to electrification.

- Health benefits were also more strongly correlated with levels of electrification (increasing by more than 50% in the high electrification scenario), rather than power sector scenario (i.e., SB100 vs Early & No Biofuels). Levels of power sector particulate matter 2.5 ($PM_{2.5}$) were largely the same for SB100 and Early & No Biofuels scenarios, at moderate and high loads.

- Looking at the cumulative unit cost of economy-wide (power, transportation, buildings) GHG emission reductions, the high load scenarios show a lower cost per metric ton of GHG emissions reduced, when compared to the moderate load scenarios. The delta is on the order of 15%-20% less ($20-$30/metric ton), than the average cost of ~$150/metric ton. This indicates that investing money in load electrification is more beneficial and cost-effective than increased decarbonization of the electric sector beyond 2030, after which the marginal benefits decline.

- With regards to retail rates (in expected dollars, including inflation over time), the Early & No Biofuels moderate load scenario was the most expensive from 2030-2045, resulting in above $0.35/kWh in 2045. By 2045, this was only slightly above the 2020 average retail rates, scaled

annually by 2.5% inflation, mainly due to low load assumptions in the 2020 average retail rates.

- Uncertainty was also discussed, mainly with regards to load projections, cost estimates for generation resources, and technology adoption rates by U.S. households. For load projections, in the LA100 Study, both energy consumption (GWh) and peak load (MW) grow largely after 2030, deviating by over 10,000 GWh and 2,000 MW in 2045 across different loads (moderate, high, stress). Examples of variance in historical LADWP load projections was also acknowledged, as well as the optimistic prediction of the LA100 Study for a growing load factor (average load/peak load; a metric to show actual utilization of facilities), as opposed to what historical trends show.

- Dr. Pickel also noted the unexpected drop in the price of electricity from renewables over the decade from 2009-2019. Photovoltaic solar dropped by ~89% ($359/MWh to $40 MWh) and onshore wind dropped by ~70% ($135/MWh to $41/MWh). In contrast, nuclear increased by ~26% ($123/MWh to $155/MWh).

- The wide range in uncertainty regarding the projected adoption rate of electrification, was also discussed.

- Recommendations by the Brattle Group analysis include:
    - Focusing on avoidable GHG reductions and weighing the costs and benefits of decarbonizing the power sector in comparison to other sectors
    - Focusing on near-term investments (through 2030, 2035) with proven technology and well understood costs while keeping options open for the future
    - Investing now in projects with longer lead times such as transmission, which contributes to environmental justice by enabling utility-scale renewables at economies of scale (lower $/MWh) while providing benefits to all customers;
    - Revisiting the end goal of "100%" taking into context what it truly means, the tradeoffs with economy-wide GHG reductions and estimated health benefits, equity considerations, and keeping track of changes in load that may impact the timing of investment decisions.

- In closing, the OPA emphasized:
    - LADWP is committed and working diligently toward eliminating all coal generation from its portfolio by 2025
    - The most important keys to success (transportation and building electrification) are outside of LADWP
    - LADWP's system needs to be strengthened to stay flexible and manage higher levels of clean energy resources; serve changing and uncertain levels of electricity use; and avoiding early over-commitment to costly technologies and changes

- <u>Major Themes from Advisory Group Member Discussion and Questions</u>
    - Interest in seeing projected costs of monthly bills, as opposed to just rates.
    - Can you speak to rate increase projections by 2030?
        - A: *We have a chart that shows the rate percentage changes by five-year periods. The business-as-usual strategy shows a roughly ~25% increase over the next four years, but it also shows large capital expenditures in that time period that are unlikely to happen. The different scenarios at the $0.25/kWh-*

*$0.30/kWh threshold give a good view. The full presentation on the website shows more details.*

- From the perspective of rates, all scenarios appear to increase dramatically in the near term, over the 2017 IRP projections. Politically, we have only been emphasizing the potential benefits of these scenarios, but the costs are also very important to keep in mind.
- Recent presentations to the LADWP Board of Commissioners on electric vehicle (EV) charger installations, give the impression that we may not be able to rely on the private sector to fully meet installation targets in environmental justice and low-income communities due to the private sector being driven by the economics of their business. LADWP may need to become more directly active in the installation of EV chargers in these communities.
- Historically, transmission projects have taken a long time to be placed into service (10-15 years). What are your thoughts on the risks and uncertainties?
  - *A: In terms of unit costs and rates, it is relatively cheap. LADWP has done a great job in its transmission diversity and this has helped LADWP be more reliable and cheaper. Expanding to areas where we may not have a lot of access to transmission, expands our access to renewables that are likely to be increasingly cheaper, and reduces the risks of cutoffs as a result from major fires and earthquakes.*
- How did the LA100 Study treat and model transmission investments and expansion? How might this impact implementation and rates analysis?
  - *A: Some of the additional slides that were not presented, talk about transmission scenarios and their benefits. Transmission projects are large and lumpy. It would make sense to do these jointly with multiple utility and industry partners to reduce risk from any specific project. Generally, transmission costs are included in the base rates, but if associated with renewables there is a chance they may not be, possibly. Specifics on modeling can be addressed by LADWP and NREL. (NREL): The modeling assumed an endpoint at which transmission would be finished. It did not look at how long the transmission work would take, and just counted the full cost when the transmission was available for full use.*
- Transmission investments make great sense from a cost and reliability basis, however due to the long buildout times required, it seems as the benefits are best achieved by a 2045 target date, as opposed to the politically-driven 2035 target date that does not allow enough time. Projects that consist of upgrading existing transmission lines or involve existing rights-of-way, may be able to be finished faster.

## 4. LA100 Next Steps

- Jason Rondou, LADWP Director of Resource Planning, Development, and Programs, presented on the LA100 Next Steps (previously called the Clean Grid LA Plan), and gave an overview of other ongoing efforts under the "LA100" umbrella. The LA100 Next Steps are a set of common investments needed to stay on track towards achieving the 100% goal, and a condensed version was given to the LADWP Board of Commissioners in May of this year, as well as to the City Council several times.

- Across all scenarios, the LA100 Study calls for a tremendous amount of additional renewables,

rooftop solar, energy storage, and other resources, as well as showing that LADWP essentially needs to double its capacity. Also discussed was the $1 billion in transmission investments that need to be made over the next ten years, regardless of scenario. The need for renewably-fueled dispatchable turbines was also brought up, which would provide backup and reliability in the event of event of extreme events such as wildfires and earthquakes, and would only be used when absolutely needed.

- In April 2021, after conclusion of the LA100 Study, in the 2021 State of the City Address, Mayor Garcetti announced that LADWP would adopt a goal to be 100% carbon-free by 2035, in addition to achieving an 80% renewable and 97% carbon-free energy mix by 2030. The Mayor also announced transitioning Scattergood Generating Station to run on green hydrogen and decreasing demand on Valley Generating Station. The LA100 Next Steps aligns shared investments across all scenarios and puts LADWP on a path towards meeting these goals while ensuring it abides by its principles of environmental stewardship, affordability, reliability, resiliency, and equity on its way towards 100%. Importantly, the LA100 Next Steps does this today, as the challenge increases exponentially with each year that passes, as 2035 is only about 13 years away.

- The tenets of the LA100 Next Steps were outlined as follow:
    - Accelerate to 80% renewable and 97% GHG-free energy by 2030
    - Accelerate transmission
    - Transform local generation
    - Accelerate energy storage
    - Accelerate distributed energy resources equitably

- To accelerate renewable energy, LADWP aims to deploy over 3,000 MW of new renewables, leveraging its extensive transmission resources and repurposing lines that previously brought in fossil-fuel energy such as those from Navajo Generating Station.

- To accelerate transmission, LADWP has identified ten key transmission upgrades that are needed over the next ten years, in order to deliver renewable power to where it is needed within the City, and maintain reliability. This will require an unprecedented development of infrastructure and flexible generation in order to reliably meet load when existing lines are taken out of service for upgrades.

- To transform local generation, LADWP has issued a green hydrogen Request for Information (RFI) for all in-basin generating stations, with the aim of constructing green hydrogen capacity at Scattergood Generating Station, in addition to efforts to retrofit Haynes Generating Station to recycled water cooling, and dramatically reduce gas usage across the entire fleet, in particular, at Valley Generating Station. LADWP emphasized that their focus is on green hydogen, which is carbon-free and can be electrolytically produced using renewably-sourced energy, as opposed to gray and blue hydrogen.

    - Regarding Scattergood Generating Station, in order to bring renewable energy to power the electrification of Los Angeles International Airport, support the Operation NEXT initiative at Hyperion, and other ongoing projects, additional capacity at Scattergood was identified to be the most immediate and instrumental need to maintain system reliability while addressing load growth. Currently, Scattergood

Units 1 and 2 are scheduled to be decomissioned in 2024 and are not used often. In order to build the necessary capacity, LADWP is proposing the extension of Scattergood 1 and 2, not to use them, but simply to have them in the case an extreme event like a wildfire brings down a transmission corridor. In turn, LADWP aims to take the opportunity to ensure a net reduction in water usage and ocean-cooling at the stations, by proposing to possibly remove Haynes Unit 8 from ocean-cooling earlier than the scheduled deadline.

- With respect to Haynes Generating Station, the combined-cycle Units 8, 9, and 10, constructed in 2005, are some of the newest and most efficient units in LADWP's generation fleet. If decomissioned in 2029, the Power System dispatch may rely on the next most efficient unit which is at Valley Generating Station. This would result in not only continued payment of debt service for the Haynes units, but also a net increase in GHG emissions. If in turn, the Haynes units are converted to recycled water cooling, there is an opportunity for a drastic reduction in GHG emissions at Valley Generating station, and a potential for a net reduction in ocean-water cooling across the entire fleet.

- Regarding Valley Generating Station, today it is used about 30% of the time on average, however the combination of 80% renewables by 2030, Haynes recycled water cooling, and Scattergood capacity is expected to significantly reduce usage of Valley down to ~5% on average by 2030. In addition, there are active efforts ongoing to explore the possibility of clean energy and storage, potentially long-duration storage projects, at Valley Generating Station, as well as continued community outreach and engagement.

- To accelerate energy storage, LADWP plans to build over 1,000 MW of energy storage by 2030, both within and outside the City. Through an advertised rolling Request for Proposal (RFP), LADWP seeks to expand energy storage by considering for the opportunity to pair all future solar projects co-located with storage. Furthermore, in all modeling scenarios, LADWP expects its usage of Castaic Power Plant pumped hydro facility to increase significantly.

- With regards to accelerating distributed energy resources equitably, LADWP aims to deploy 1,000 MW of local solar, 500 MW of demand response, double energy efficiency, and suppport ~580,000 electric vehicles by 2030. LADWP also aims to adopt a goal of directing 50% of distributed energy resource investments to go towards disadvantaged communities. Significant recent achievements and efforts with regards to distributed energy resources include:

    - Expanded Feed-in Tariff from 150 MW capacity to 450 MW in 2020
    - Advertised Distributed Energy Resources RFP in 2020
    - Expanded Commercial Demand Response program in 2020
    - Launched Feed-in Tariff+ pilot in 2021
    - Launched Virtual Net Energy Metering pilot in 2021
    - Expanded Power Savers program for Summer 2021

- On the distribution level, significant levels of infrastructure and equipment upgrades, as well as deployment of smart equipment for metering and operator visibility, will be crucial for distributed energy resource deployment. Current planning efforts estimate substation capacity

shortfalls upwards of 500 MWs by 2040, which will require the building and expansion of tens of new stations, of which LADWP has only built two in the past two decades. Furthermore, the distribution system currently has over 500 feeders (distribution lines) over capacity, and will need to increase replacement targets urgently to even get the distribution system to the starting point the LA100 Study assumes, in order to adequately handle increased load as a result of distributed energy resources and electrification efforts.

- With respect to required yearly capacity buildouts for a 100% carbon-free by 2035 scenario, LADWP must undergo an unpresedented buildout of resources, both in the Los Angeles basin and outside of it, to reach the target. Out-of-basin, on average, approximately 629 MW of utility-scale renewables would need to be built annually through 2035. Furthermore, within the space-constrained LA Basin, on average, approximately 175 MW of dispatchable renewably-fueled turbines as well as 342 MW of solar plus storage, need to be built annually by 2035.

- In conclusion, Rondou noted that LADWP alone cannot solve climate change, but LADWP can set the blueprint for other utilities to decarbonize if it is done reliably, affordably, and equitably. Even on top of the monumental investments called for in the LA100 Study, it is important to recognize several caveats that will play an important factor such as the importance of electrification load materializing in order to control the cost of rates and avoid the significant rate shock that would accompany such levels of investment under low load scenarios, as well as solving the distribution system overloads that the LA100 Study assumed did not currently exist. Non-technical challenges such as politics, real estate, and others, will need to overcome if the distribution system is to be properly readied for widespread electrification, and LADWP will need to maintain reliability throughout the entire process, ensuring the Port of Los Angeles, Los Angeles International Airport, and others are provided the power and reliability needed as the City decarbonizes together. In the near term, the green hydrogen RFI responses are due in November, and an update will be given when there is more information on that effort.

- <u>Major Themes from Advisory Group Member Discussion and Questions</u>
    - Will we receive an overview of what the 10 in-basin transmission projects are and what the barriers are to achieving them?
        - *A: Not sure if it is agenized yet, but we should find an opportunity to talk about those projects. Last time LADWP built a new corridor in L.A., it took about 12 years due to all the permitting and environmental processes. Perhaps finding ways to streamline the California Environmental Quality Act process, as well as the process through the federal agencies, may help. The timeline that it takes to build transmission for renewables does not match the timeline for the building of the actual renewables.*
    - Is putting money into keeping a gas plant online at Haynes, and not shutting down all gas plants that the L.A. Green New Deal calls for, the way you expect us to move to 100% clean energy?
        - *A: Part of what was answered in the LA100 Study is an understanding of the significance of resilience and reliability required within the LA Basin, and gas units would not be relied on, but would be used extraordinarily less only during extreme events, as they are decarbonized over the long term. That is the importance of the green hydrogen RFI. However, the LA100 Study made it very clear that in order to decarbonize reliably, on high-heat and extreme event days, LADWP needs in-basin capacity.*

- There is a fundamental illogic in the "equity" issue of where the distributed energy resource investments are being made. All customers benefit equally from the "greenness" of the total power system. External non-engineering factors may be influencing the geographic emphasis.
- How many MW of solar + storage are we currently installing per year?
  - *A: LADWP is actively negotiating large scale projects and the next project slated to come online is a 400 MW solar plus storage project, of which LADWP has a 375 MW share. LADWP is also investigating other opportunities to deploy solar plus storage.*
- In the current political climate, the Early & No Biofuels scenario appears to be the most expensive and unreasonable in terms of the near-term in-basin infrastructure required. This SLTRP is about practical engineering rather than politics.
- Will the ongoing drought impact Castaic and Hoover (hydro) Power Plants?
  - *A: For the SLTRP process, LADWP will be updating its assumptions on Hoover Power Plant water levels from the Western Area Power Administration, as well as Castaic Power Plant inflows. We would like to hear from the AG on sensitivities to stress test our scenarios. Regarding Castaic Power Plant, it is a pumped storage facility where we can run water up and down, thus it is not significantly affected by the drought.*
- We really need to work in the super-drought scenario.
- This SLTRP must address climate justice if we are going to meet the urgency of the crisis!
- Energy storage does not get the Power System through days of a transmission line being down. In-basin combustion generation is with respect to addressing blackout issues.

## 5. LA100 Assumptions & LADWP's Power System Reliability Program (PSRP)

- Vincent Zabukovec, LADWP Manager of Distribution System Engineering, gave an overview of assumptions and caveats of the LA100 Study with respect to LADWP's distribution system, including that:
  - Existing distribution overloads were mitigated by 2020
  - Future distribution overloads were mitigated by new circuits and transformer banks (no new substations)
  - Transmission projects in the 10-Year Plan will be completed on time
  - Land acquisition and community engagement not considered
  - Considerations for distribution voltage upgrade were not part of the study

- Zabukovec went on to explain that new land will need to be purchased and substations will need to be built in order to meet LADWP's goals. Furthermore, an overview of the Power System Reliability Program history and objectives was covered, including that the Power Reliability Program was implemented by LADWP in 2007 to address distribution system reliability concerns, and that in 2014 it was replaced with the Power System Reliability Program which expanded to include generation, transmission, substation, and distribution sectors.

- Budget for the Power System Reliability Program was discussed, including expenditures of over $1B over the last two years and an anticipation for these expenditures to increase. Also covered were recent accomplishments for distribution assets (poles, crossarms, cables, transformers) such as meeting established targets over the last five years, as well as efforts to achieve substation

asset replacement targets (transformers, circuit breakers, substation automation) despite competing capital projects and recent COVID-19 challenges.

- Major substation accomplishments highlighted for Fiscal Year (FY) 2019-20 include replacing one Receiving Station transformer, 15 Distributing Station transformers, 15 circuit breaker replacements, and 7 substation automation (SAS-2) upgrades.

- Regarding circuit overloads, at the 4.8 kilovolt (kV)-level, 328 circuits are currently identified to be over 100% loading, largely attributed to the shift in returning to work and school in person, and over 21 34.5 KV-level circuits are identified as overloaded, such as the Port of Los Angeles, and Los Angeles World Airports.

- Regarding Distributing Station overloads, over 27 were under overload conditions as of last year, and several strategies are currently being explored for more capacity, such as replacing existing transformers with larger ones and expanding the stations. Conversion to a new voltage may help reduce the amount of Distributing Stations that would have to be built at the 4.8 kV-level.

- Furthermore, to prepare LADWP's distribution system for 2022-2035, the following actions need to be taken:

    - Upgrade 4.8 kV circuit capacity
    - Expand 34.5 kV circuit capacity
    - New 4.8 kV distribution station capacity
    - Upgrade and new receiving station capacity
    - New distribution voltage conversion

- Currently, LADWP is evaluating options for converting the distribution voltage from 4.8 kV to a higher level to address higher load growth, distributed energy resource adoption (such as solar and energy storage), and a constrained footprint to expand, and has analyzed five different voltage options in a study with the Electric Power Research Institute (EPRI).

- With respect to the distributing station load forecast by the year 2035, currently LADWP anticipates that over 60 distributing stations will be overloaded and that at least 10 new stations will be required to address overloads that cannot be resolved by offloading to adjacent circuits. This presents a significant challenge, and a voltage conversion would assist in reducing the amount of stations that would have to be built.

- In terms of capital cost, ~$24.6 billion are currently projected for conversion of the distributing level voltage to 12 kV. Costs for the 34.5kV system span from ~$12.2 billion to ~$22.5 billion. Investments would have to be spread over several decades due to the amount of workload that would have to be performed.

- In conclusion, the Power System Reliability Program needs to be revamped to address overloads the LA100 Study assumed to be complete, and meet the desired objectives. Distribution asset upgrades will need to be increased four to six-fold, new distributing and receiving stations will need to be built by 2045 to address load growth, and automation (distribution and substation) will need to be expanded to improve reliability. To do this, schedules will need to be verified,

labor and material resources determined, budgets secured, targets discussed with stakeholders, and outreach as well as approvals undertaken.

- Major Themes from Advisory Group Member Discussion and Questions
  - Regarding ratings, is an overload defined to be loading above 100% of the continuous facility rating, or above 150% of the continuous facility rating? If you are going to upgrade distribution do you agree an overload should be defined as loading above 100% of the continuous facility rating?
    - *A: Great question, we agree 100% over facility rating is the rating at which that component is overloaded, even though in some cases we're able to operate under emergency conditions over 100% but we want to be operating at a level that provides flexibility to operations.*
  - Can LADWP create a "No Regrets" presentation for community members so that they understand? Or help create this presentation?
    - *A: LADWP will work on this request and opportunities to collaborate on outreach and engagement.*
  - Concerns regarding long lead times for procurement of critical power system equipment such as new transformers, and associated reliability and resiliency risks under extreme events.
  - Are there plans to partner with local agencies such as LA Metro as they electrify their bus fleet, and LAUSD to integrate more renewable energy and distributed energy resources?
    - *A: Yes, our transportation electrification group is working with LA Metro on their electric vehicle bus fleet. There may be an opportunity to have them present in a future AG meeting, and we would like to hear the AG's thoughts on this interest. We can bring in our EV group to give an overview of programs if AG is interested.*
  - Interest in planned investments for LADWP's 34.5 kV system and compatibility with EV fast charger interconnection.
  - Interest in possibilities of upgrading the 4.8 kV system to a higher voltage.
  - Wouldn't having more distributing stations have the upside of creating more localized resilience?
    - *A: Excellent question, LADWP still plans to build more distributing stations. Having shorter circuits lowers exposure, however in certain areas we may not have the ability to build new stations, thus part of the design process is to improve operational capability through various different strategies.*
  - Given the well-publicized federal interest in LA100, what would be the possibility of working in coalition with other cities/utilities to procure resources, both physical and personnel, for this transformation?
    - *A: Great question. Typically, in emergency conditions we have mutual aid in which utilities help each other. We typically have to create new contracts and would consider the contracting resources other utilities may have to building out more extensive distribution systems. We do consider various options, thus that is something that can also be considered.*
  - Interest in recyclability as a criterion for utility-scale solar projects.

## 6. Discussion and Polling

- Jay Lim, LADWP Manager of Resource Planning went over the AG Meeting Plan and set the stage for polling questions pertaining to what the AG would like to learn more about at upcoming meetings, as well as important considerations for modeling scenario definitions.

**POLLING RESULTS**[2]

*Question #1: What do you think is most important to consider in the scenario definitions? Please make the answers concise, and multiple answers can be submitted.*

1. I think most important in the scenario definitions is WHAT technology will be planned and WHY it was chosen.
2. What is the case for LATER power 100% in order to invest more in EVs electrification, which generates MORE GHG reductions?
3. Reliability is most important
4. The LA 100 Study alluded to more cost saving for ratepayers if we figure out multi day demand response. LADWP should put more time and effort into engaging customers in creating a robust multi day demand response program that can engage and incentivize expedited adoption of electrification. Also, the impacts of pushing even green hydrogen as part of LA100 by 2035 pathway should be measured before the electrolysis process. The increase market of green hydrogen is dependent on all hydrogen going down in prize, but that will just make grey and blue hydrogen less expensive and fossil fuels will continue to pollute. furthermore, EJ and equity demands you also county emissions from green hydrogen like NOx and leaks.
5. How to address future uncertainty renewable production, how to reach renewable goals while maintaining reliability and minimizing cost ratepayers (both rates and pass-throughs), how to build in flexibility in planning to accommodate future technologies.
6. Is EARLY (2035) truly a reasonable path, especially since it will require EARLY ADOPTION of green hydrogen in critical large-scale in-basin generating plants? A more economical path would put green hydrogen LATER in the LA100 path (Politics of climate change panic versus engineering and RATES sensitivity to a poor city. PRICE is the ultimate "equity" consideration for low income families).
7. Different demand response options
8. Greenhouse gas emissions reductions as soon as possible, including from entire lifecycle of fuels (e.g., methane emissions from natural gas production and distribution).
9. Demand/load (inclusive of both electrification and demand response and flexibility assumptions)
10. Most important to consider load growth in scenarios
11. Leveraging built environment (via DERs) as much as possible given LA density
12. Energy and fuel resources allowed/available
13. Don't we need the 'scenario' to be OURS (a combination, not one of NREL's 4 or an externally dictated package from politicians?
14. Taking bold steps on some less proven tech to support long-term needs
15. Reliability, impact on average customer monthly total energy bill including gas and gasoline, GHG at 2030.
16. Considering diversity in technology and strategies
17. Key investments to provide optionality

[2]Comments and poll results shown are informal and should not be considered a representative nor complete illustration of the Advisory Group's opinion at large.

*Question #2: The SLTRP process typically analyzes various programs and projects as part of its resource mix. What types of programs are you interested in and would like to learn more about at the upcoming 10/22 meeting?*

- Transportation Electrification (13 responses)
- Energy Efficiency (10 responses)
- Demand Response (9 responses)
- Customer Sided Energy Storage (6 responses)
- Local Solar (3 responses)
- Fuel switching incentive (1 response, via chat)
- Building electrification (2 responses, via chat)

## 7. Wrap Up and Next Steps

- Next meeting will be on Friday, October 8, 2021 (10am-12pm) and will cover an SLTRP deep dive including review of the latest state efforts in relation to Senate Bill 100, 100% Carbon-free by 2035 requirements presented by NREL, LADWP efforts relating to green hydrogen, and key considerations for potential scenarios.

*Next Meeting: Friday, October 8, 2021; 10:00 am-12:00pm, WebEx Platform (Virtual)*