

LA100 EQUITY STRATEGIES



Los Angeles 100% Renewable Energy Equity Strategies

Advisory Committee Meeting #5

August 24, 2022

Summary¹

Schedule and Location

Wednesday, August 24, 2022, 10:00 a.m. to 12:00 p.m.

Conducted virtually

Virtual Meeting #5 Attendees

Advisory Committee Members

Center for Energy Efficiency and Renewable Technologies (CEERT), V. John White, Jose Carmona (alternate)

Chief Legislative Analyst, Rafael Prieto (alternate)

Civil & Human Rights and Equity Department, Claudia Luna, Bruce Gip (alternate)

Council District 05 – Councilmember Paul Koretz, Councilmember Paul Koretz, Andy Shrader (alternate)

Council District 08 – Councilmember Marqueece Harris-Dawson, Rachel Brashier (alternate)

Council District 09 – Councilmember Curren Price, Sherilyn Correa, Christopher Diaz (alternate)

Housing Authority of the City of Los Angeles, Marisela Ocampo, Lisette Belon (alternate)

LA Cleantech Incubator, Mayte Sanchez

Los Angeles City Planning Department (LACP), Shana Bonstin (alternate)

Los Angeles Department of Transportation, Shirin Sadrpour (alternate)

Los Angeles World Airport (LAWA), Carter Atkins (alternate), Laura McLennan (alternate)

Natural Resources Defense Council, Manish Bapna

Neighborhood Council Sustainability Alliance (Advisory Committee), Ernie Hidalgo

Office of Public Accountability (Rate Payer Advocate), Fred Pickel, Camden Collins (alternate)

Office of Los Angeles Mayor Eric Garcetti, Paul Lee (alternate)

Port of Los Angeles (POLA), Carlos C. Baldenegro

Sierra Club, Francis Yang (alternate), Teresa Cheng (alternate)

Southern California Association of Non-Profit Housing, Chris Bowen (alternate)

LADWP Staff

Andrew Kwok

Cathie Chavez-Morris

David Castro

David Rahimian

Dawn Cotterell

Emil Abdelshehid

¹ This summary is provided as an overview of the meeting and is not meant as an official record or transcript of everything presented or discussed. The summary was prepared to the best of the ability of the notetakers.

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Iris Castillo
Jason Rondou
Jay Lim
Joe Ramallo
Mudia Aimiuwu
Pjoy Chua
Ramon Gamez
Robert Meteau
Simon Zewdu
Vanessa Gonzalez

Project Team

Alana Wilson, National Renewable Energy Laboratory (NREL)
Ashreeta Prasanna, NREL
Benjamin Sigrin, NREL
Bryan Palmintier, NREL
Daniel Zimny Schmitt, NREL
D-Y Lee, NREL
Eda Giray, NREL
Garvin Heath, NREL
Janet Reyna, NREL
Luna Hoopes, NREL
Megan Day, NREL
Nicole Rosner, NREL
Sonja Berdahl, NREL
Thomas Bowen, NREL
Christian Mendez, Kearns & West
Jasmine King, Kearns & West
Joan Isaacson, Kearns & West
Karen Lafferty, Kearns & West
Robin Gilliam, Kearns & West
Cassie Rauser, UCLA
Greg Pierce, UCLA
Rachel Sheinberg, UCLA

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Welcome Remarks

Joan Isaacson, facilitator from Kearns & West, welcomed Advisory Committee members to the fifth Los Angeles 100% Renewable Energy Equity Strategies (LA100 Equity Strategies) Advisory Committee meeting. She introduced Simon Zewdu, Director of the Transmission Planning, Regulatory, and Innovation Division at LADWP, to provide opening remarks.

Simon Zewdu welcomed Advisory Committee members to the meeting, noting that LA100 Equity Strategies is progressing in earnest and the project team would provide updates on that progress. He also shared that the LADWP Board of Commissioners presented at the LADWP Board of Commissioners meetings on extreme heat and reducing its impacts. Simon Zewdu stated that LADWP is working on a new initiative called "Cool LA" which provides rebates for City of Los Angeles residents to purchase or replace various types of cooling units, including window and room air conditioners, at a reduced cost to lower extreme heat indoor temperatures to a safe level. He noted that LADWP will provide updates on these programs and initiatives in upcoming Advisory Committee meetings.

Agenda Overview and Introductions

Joan Isaacson reviewed the meeting agenda (see slide 3 in Appendix). She shared that UCLA would present its energy affordability and policy solutions analyses, and the National Renewable Energy Laboratory (NREL) would present Steering Committee feedback on modeling, analysis, and strategy development. Joan Isaacson explained that Advisory Committee members would have an opportunity to ask questions and provide feedback in breakout group discussions. She reminded Advisory Committee members of the protocols for primary and alternate Advisory Committee members, stating that the primary representative should be the one participating in the discussions unless unavailable.

Energy Affordability and Policy Solutions Analysis

Greg Pierce, Co-Director of the Luskin Center for Innovation (LCI), presented UCLA's research on affordability, rates, and revenue related to LA100 Equity Strategies. He stated that customer affordability was found to be among the most important considerations identified through the LA100 Equity Strategies process, as well as broader LADWP equity considerations.

Greg Pierce highlighted key findings from the UCLA team's research. First, he explained that the LA100 transition costs necessitate additional utility revenue, which is primarily recovered through the rates paid by customers. Affordability refers to customers' ability to pay their bills, the bulk of which affects rates, he noted. Rate redesign is a primary affordability policy instrument but is not the only one. Lastly, Greg Pierce shared that folding building and transportation electrification costs into the LA100 transition heightens concerns over affordability.

He overviewed LCI's three affordability analyses, including structural and baseline affordability considerations, energy affordability metrics, and energy affordability policy options. Stating that the LCI synthesizes data from four types of sources, including existing quantitative data, academic literature, published reports, and stakeholder input. LCI's approach is complemented by NREL's modeling and the rate structure focus from the UCLA School of Law. Key goals of the methodology include focusing on meaningful goals and policies; working with partners to set up a long-term data, analysis, and strategy architecture; and considering legal challenges.

Greg Pierce reviewed baseline affordability consideration questions (see slide 9 in Appendix) and data sources from Loyola Marymount University and UCLA, the California Energy Commission's Residential Appliance Saturation Study (RASS), LADWP Community Services and Development (CSD) program enrollment data, and others (see slide 10 in Appendix). Considerations of the analysis (see slides 11-15 in Appendix), include the fact that the whole bill matters for affordability, inequitable debt burden, air conditioning under-consumption in low-income communities, revenue impacts to LADWP for EZ SAVE and Lifeline program



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participants, and barriers to participation in customer programs. Underscoring initial metrics being used in the analysis, such as bill discount enrollment, percentage of income payment plans, and a household-based energy budget (see slide 16 in Appendix).

Greg Pierce shared that the UCLA team will be analyzing eight policy categories by policy mechanism, LADWP offerings and other relevant policy models, barriers to enrollment and scaling up, and the impact of the policy approach. Finally, he reviewed Steering Committee feedback from a ranking poll of the metrics and policy categories presented.

Regarding affordability, Steering Committee members ranked shutoffs due to non-payment and bill discount enrollment as the most important metrics. Other metrics of high importance included thermal comfort and electricity insecurity. Greg Pierce said that the UCLA team received mixed opinions on electricity burden and household-based energy budgets as affordability metrics. He noted the rating of electricity based on service cost and electricity use intensity as the least popular affordability metrics.

Greg Pierce highlighted some of the feedback received on policy categories. Steering Committee members ranked the direct assistance and crisis relief, rate and billing design, and structural efficiency policy categories the highest. Community solar was ranked as moderately popular. Steering Committee members had mixed opinions on rooftop solar and appliance efficiency, and microgrids and demand response were the least popular policy categories.

Major Themes from Advisory Committee Questions and Discussion

- Another component is comparing [LADWP] programs to other programs and the low-income rate available from other major state utilities. It is important to ensure that LADWP can provide similar programs. Although if an arbitrary discount is offered from LADWP rates, the discounted rate could be substantially lower than the rates at a number of the Investor-Owned Utilities (IOUs), and it is necessary to understand when that's the case.
 - Greg Pierce: That is definitely something that UCLA is looking at in the next stage of the analysis.
- If you were to choose a second metric around electricity burden (see slide 16 in Appendix), would that also capture the first metric? Capturing more than just the enrollment side is important, since barrier of entry to enrolling in the program is an issue.
 - Greg Pierce: Yes, regarding the second metric around electricity burden, the California Public Utilities Commission (CPUC) is running a specific pilot for IOUs for energy use called the Percentage of Income Payment Plan (PIPP). PIPP is the most comprehensive way to address affordability, but it's also computationally difficult and some other challenges exist.
- Thermal comfort is key and is favored as a metric for this analysis. So many individuals can't even use or perhaps don't even have a way of cooling. They don't have an air conditioning system, a heat pump, etc.
- Are possible reductions in natural gas consumption, and reductions in gasoline consumption as people transition and become more electrified, being considered in this analysis?
 - Greg Pierce: Broadly, yes. UCLA doesn't know the exact trajectory and timing of the transition and what that will look like. In the next few decades, it is expected that what people would pay on their natural gas bills would essentially be folded into the electricity bill. NREL's analysis is also going to combine existing natural gas bills into an overall energy affordability analysis, so UCLA is also looking at that. There's still some uncertainty about the timing and the transition, but the research teams are looking at this.
- It was mentioned that disadvantaged low-income communities (DACs) are underutilizing utilities, however, they have the most utility debt. Could you expand on what you mean? How was that included in these metrics and how can it be further expanded? Even though DACs have the biggest debt, they're using the services less, and it was mentioned that the project team wanted to look at opportunities to increase utilization. If the goal is to conserve more energy and be more efficient, why an interest in increasing utilization amongst DACs?

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- Greg Pierce: High debt burden has increased during the COVID-19 pandemic and not all folks that are eligible and in need of assistance are enrolled in programs. Currently, specific avenues exist to relieve the debt burden, but they won't relieve the burden entirely. Programs are needed to address the debt burden over time. Some customers are consuming as much power as they need but are unable to pay. Others are under consuming and so the project team is looking to find ways to support increasing consumption in these households while also keeping bills affordable. While it is a challenge to balance affordability and energy consumption, little evidence indicates that customers that receive support on their bills would dramatically overconsume energy.
- Simon Zewdu: This is a question we've been wrestling with in terms of allowing some customers who are burdened because of their bills to consume more and maximize thermal comfort. There are some health and quality of life impacts on some communities because they are under consuming. Some customers need to prioritize their health and one of the issues raised is extreme heat. The project team is trying to understand where the heat islands are and which communities are being impacted in Los Angeles because of extreme heat. Underconsumption is part of the problem.
- The digital divide plays a big role in their [low-income communities'] lack of consumption because they don't have the same electronics as other Angelenos. That is part of why Councilmember Curren Price is developing Slauson Connect. It's a recreation and education center that will allow low-income community members or South Los Angeles residents to come and plug in, get Wi-Fi access, and use creative labs. It's particularly focused on youth because we know that consumption when it comes to energy, it's all devices at home. That's what our generation or era has become accustomed to. The intention is, instead of isolating within our own individual homes, to allow a safe space so that community members can come and erase that digital divide that has emerged in our generation.
- There is a potential collaboration between LADWP and Slauson Connect to find ways to incentivize and further support these centers in South Los Angeles communities so that they can become more resilient with time.
 - Robert Meteau (LADWP Chief Officer of the LADWP Office of Diversity, Equity, and Inclusion [DEIO]): The Equity Metrics Data Initiative (EMDI) is looking at 15 metrics including areas of water and power infrastructure. Additionally, LADWP is looking at customer incentive program and services, and procurement and workforce development metrics. LADWP will follow up offline for discussion in sharing data from the EMDI analysis. The LADWP DEIO is transitioning to a review of the EMDI and previously identified equity metrics and looks forward to the next steps, as some equity metrics intersect.
- How is "magnitude of impact" measured?
 - Greg Pierce: Essentially, that is trying to estimate how big of an impact a given policy would have in reducing bills or supporting affordability. It recognizes, for instance, how the Percentage of Income Payment Plan would have returned perhaps the most dramatic impact on supporting affordability but would be scored as less feasible in other dimensions and potentially be more costly from a revenue perspective. Whereas other approaches such as community solar would have relatively less impact on affordability, community solar has lots of other benefits that relate to equity and an LADWP program already exists. There are potential trade-offs in the impact on affordability, specifically feasibility and other energy or equity benefits that a particular policy would have. The magnitude of impact can be modeled, but going forward, that attribute has some subjectivity.
- What is structural efficiency?
 - Greg Pierce: It is helping folks either pay directly or enroll in programs such as Low-Income Home Energy Assistance Program (LIHEAP) that increases the insulation (e.g., roof, walls, windows, or others) for their dwelling place. This helps them to consume less energy to get the end uses for the electricity that they need, reduces demand and thus reduces their bill.

LA100 EQUITY STRATEGIES



Rate Structure

Rachel Sheinberg, UCLA School of Law, presented on the rate structure analysis for affordability and distributed energy access. She stated that she is working with the UCLA School of Law and LCI to analyze ratemaking and mitigate rate impacts on vulnerable residents. The team is looking into programs such as New York's household percentage program; the Seattle City Lights Low-Income Rate where residents receive a 60% reduction in bills; and the California Public Utilities Commission's percentage of income payment plans, which limit bills based on income levels, and on-bill financing for energy efficiency measures that enable customers to access energy efficiency upgrades with no up-front costs.

Rachel Sheinberg shared that the team is taking into consideration legal constraints with a goal of developing a portfolio of options that are both possible now and may become possible with legal changes. She welcomed Steering Committee members' feedback on these programs and noted that the program analysis will be done without legal constraints. The team will collaborate with NREL and the California Center for Sustainable Cities to understand the costs and benefits of various programs using data from LADWP. She stated the team's goal is to provide the community and LADWP with a portfolio of possible affordability programs and how they can be implemented.

Major Themes from Advisory Committee Questions and Discussion

- The idea of surge pricing sounds scary at first glance, but it would be interesting to discuss it further. I don't see why we would want to do that and how that could be advantageous. I'm imagining that the pricing would go higher when everyone must use it, and oftentimes we don't have choices of when we must physically use energy.
- All the models would be ideal to further expand upon and compare to one another so that a unique model can be developed for Los Angeles because there are so many intricacies. It should also be noted that Los Angeles, in comparison to other cities like New York, is so widespread and diverse. Perhaps models are needed that fit each grid so these affordability analyses can be maximized fully.
- New York has a pilot for heat pumps in apartments. More information and measures for that would be interesting.

Small Business Affordability

Paul Ong, UCLA Center for Neighborhood Knowledge, presented an analysis focused on ethnic minority-owned small businesses (MOBs). He stated that the team wants to ensure that MOBs remain viable in the transition to renewable energy. Paul Ong explained the three components of the analysis, including an analysis of current energy use among MOBs, an assessment of MOB participation in previous LADWP energy savings programs, and a survey conducted via phone, internet, and in-person in partnership with small businesses serving community-based organizations. He noted that key modules include COVID impact analyses and access to relief programs, sustainability practices, and structural elements of the energy burden.

Major Themes from Advisory Committee Questions and Discussion

- One particular issue facing minority businesses and small businesses in South Los Angeles is that infrastructure has not been updated for generations. When new developments come in, oftentimes, that property owner will have to increase the entire pathway of power to connect to the most updated facility. That's a huge problem for these business owners because it exponentially increases the cost of affordable housing development. Minority business owners and South Los Angeles residents are constantly battling these cost issues, in addition to time delays. In development, the longer residents and owners must wait, the higher the cost of the project. A recent client shared that they're expecting a 3-year delay for their design, and this delay really impacts how these communities are developed.

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- The Missouri-based bill financing approach seems applicable to small businesses that work in the food industry but also in residential units as well.
- How will NREL ensure that the modeling will result in actionable implementation recommendations?
 - Simon Zewdu: Related to MOB's and others, LADWP will plan to collaborate with the Department of Public Works and the City of Los Angeles Bureau of Contract Administration, which does have a repository of minority businesses located within the City of Los Angeles. Having realistic data as a baseline would help the project team can make recommendations.
 - Megan Day, Equity Strategies Project Manager and NREL Senior Energy Planner: NREL will do a deep dive into modeling analysis to develop strategies. The strategies will be implementation-ready in terms of options, prioritization, and considerations for actionable approaches, whether that be policy, programmatic or particular populations that are in greater need of particular approaches. Modeling analysis will also quantify exploration of, recent comments about infrastructure upgrades. This will include modeling current and future needs for distribution grid infrastructure upgrades to support equitable transportation electrification and solar and storage integration across the City. Modeling will also consider whether all communities are resilient to events and disasters. NREL will provide an actionable plan and schedule for infrastructure investments, among other strategies.

Breakout Group Discussions: Key Takeaways from Steering Committee Modeling, Analysis, and Strategy Development

Joan Isaacson explained the process for the breakout sessions, noting there would be three discussion groups for Advisory Committee members. She stated that the technical teams would rotate through breakout rooms and present to each discussion group on six topics: buildings, affordability and rates, grid reliability and resilience, local solar and storage, truck electrification, air quality and health impacts, and transportation.

Buildings

Janet Reyna, Technical Lead on Housing and Buildings at NREL, summarized Steering Committee feedback on buildings and housing (see slide 31 in Appendix). One of the top comments heard by the project team, she said, was that success includes ensuring renters – particularly low-income renters – access upgrades, savings, and benefits. Janet Reyna noted that NREL is also evaluating technology, billing, and deployment strategies to increase access to home cooling, solar/storage, electric vehicle (EV) charging, and energy efficiency in multifamily and renter-occupied buildings. Another piece of feedback heard was the focus on the elderly and the most vulnerable. As a result, she shared, the modeling will focus on universal thermal health and safety by analyzing indoor temperatures under various scenarios. Other feedback included strategies to focus on heat island areas and not penalizing cooling for those that need it most.

Janet Reyna asked Advisory Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling. Additional requested input included the feasibility of the proposed pathways, including whether the pathways align with their agency's initiatives and goals.

Major Themes from Breakout Group 1

- Nature-based solutions aren't represented in the key takeaways.
- Inform people if they are exempt from time-based demand increases. This would be important to achieve.



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- Ensure City of Los Angeles efforts such as the [Biodiversity Motion](#), introduced by Councilmember Koretz, overlays with LA100 Equity Strategies, including nature-based solutions. Protecting the natural world will help protect Los Angeles residents going forward. It is important to think holistically about what the rest of the City of Los Angeles is working on.

Major Themes from Breakout Group 2

- Prioritizing the heat island areas and comprehensive thermal health and safety is necessary, and important
- How interactive will the modeling be given that everything is changing because of the energy transition? Can the modeling be used to analyze where to invest to counteract the heat island effect, like prioritizing where to put shade structures?
 - Janet Reyna: NREL wants to look at things spatially. NREL is doing 50,000 spatially located home samples where they know the number of residents, technologies available, and more. NREL is looking at the physics and the before and after of the transition. For example, what happens if you put heat pumps in a home with no insulation? After this model runs, NREL will look at different factors.
- Can the building's modeling be tracked long-term? Can this be used for the future?
 - Janet Reyna: The modeling is not well set up to do that. NREL is doing a 2035 and present-day snapshot.
- There is a lack of certified installers in the solar industry. LADWP has some direct programs but can't hire and train people fast enough. Certified installers are needed.

Major Themes from Breakout Group 3

- Renters must be able to access the benefits of the programs being designed.
- Thermal comfort is an important metric.
- Layer interventions (heat pump, weatherization, cool roofs, etc.) in the analysis.
- Overlay urban heat island mapping with other mapping tools.
- Don't penalize cooling when it is needed most.
- Does this analysis consider new construction? Passive cooling (i.e., using design choices to reduce heat gain and increase heat loss) should be a priority.
 - Janet Reyna: The analysis mostly considers existing building stock but will consider both [newer and older] strategies.
- Most housing authority properties are old, and they have more challenges in implementing efficiency measures.
- Not a lot of money is available for improvements (e.g., \$20 million is available for 14 properties in Los Angeles with thousands of tenants).

Affordability and Rates

Thomas Bowen, Renewable Energy Researcher with NREL, overviewed Steering Committee feedback on affordability and rates (see slide 32 in Appendix). He noted Steering Committee members highlighted that strategies should include income-adjusted rates, maximum bill as a share of income, expanded participation in existing programs, and technology-install approaches. Thomas Bowen noted that NREL would model the strategies listed. Other feedback focused on considering the whole costs for the customer (e.g., trash, water, power, housing, and gas), considering household size, and anticipating administrative barriers to income-adjusted rates. He shared that a key takeaway for NREL would be to include gas and water costs in the analysis and explore the feasibility of including trash services in the final bill estimation and analysis.

LA100 EQUITY STRATEGIES



Thomas Bowen asked Advisory Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling.

Major Themes from Breakout Group 1

- When talking about household size, are you referring to the actual building size or the number of occupants? Bel Air is one of the neighborhoods with houses that have the greatest carbon footprints. It is important to ensure that the rest of the City doesn't pay for that footprint.
- Is there a mechanism to turn carbon tax credits into an asset class?
- Are you able to cross-analyze income rates with heat island effects or locations? Does the modeling in general for this study assume that all those costs are put into rates? Is it possible to introduce hyper-local pricing?
 - Janet Reyna: Income, owner/renter status, location, urban heat island, and the number of occupants are components available to model.
 - Thomas Bowen: This would add quite a bit of overhead for LADWP even if it were technically feasible, but this discussion is in progress.
- The Neighborhood Council Sustainability Alliance (NCSA) has been looking at a "[Cool Blocks](#)" initiative. This is where one neighbor invites another to neighborhood preparedness, including water conservation, cooling, and bill reduction. It might be a good tool for LADWP to consider.
- Cool City Challenge: <https://www.shareable.net/a-cool-million-three-cities-win-big-for-people-powered-climate-action/>
- Community Forest Advisory Committee: <https://dpw.lacity.org/commissioners-boardroom/community-forest-advisory-committee>

Major Themes from Breakout Group 2

- LADWP is behind the progress made by investor-owned utilities. The timescale for amending ballot propositions is only in major elections, and the opportunity to do so is now two years off. It is important to consider other ways of funding. The simplest way is to make the low-income programs fairer and get funding outside the utility.
- Many of these affordability technologies will be adopted by most, so how can there be different strategies that are most cost-effective for utility and customer?
- Do as much as possible in homes, as this will help with load flexibility as well.

Major Themes from Breakout Group 3

- Offer multiple strategies that include income-adjusted rates and increased program participation.
- Consider the whole cost to the customer (e.g., trash, water, power).
- Consider household size in the analysis.
- Anticipate administrative barriers to income-adjusted rates (e.g., income data)
- Develop a reasonable baseline to compare metrics to.
 - Thomas Bowen: NREL is working to capture the burden of monthly bills and accumulated debt to give LADWP a firm understanding of the trade-offs of each strategy.
- Adoption rates are difficult to measure.

Grid Reliability and Resilience



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Bryan Palmintier, Senior Research Engineer with NREL, overviewed Steering Committee feedback on grid resilience and distribution grid impacts (see slide 33 in Appendix). First, he stated, Steering Committee members noted that some parts of the grid already require upgrades. Bryan Palmintier explained that NREL would incorporate current required upgrades with upgrade schedules that prioritize DACs. Other feedback focused on prioritizing resilience-hub-type opportunities (e.g., community centers) for cooling, vehicle and phone charging, and potential water purification, and considering older electrical panels and wiring in some homes. Bryan Palmintier noted that NREL would be prioritizing in-home or close-to-the-customer solutions.

Bryan Palmintier asked Steering Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling.

Major Themes from Breakout Group 1

- In Palms, which is the lower income part of Council District 5, an LADWP water main broke and resulted in \$200,000 repairs to upgrade the grid for that block. It seems like most of the grid needs to be upgraded to go fully electric. Is there money in the infrastructure bill for that?
- If all the cities in the country are upgrading grids at the same time, competition for resources, materials, and labor will be increased. Is part of that consideration included in the analysis?
- There is substantial interest in distributed energy resources (DER) for disadvantaged communities.
- Looking at workforce capacity might be helpful in the analysis.

Major Themes from Breakout Group 2

- Will this analysis include the replacement of power poles, transformers, and underground cables?
 - Bryan Palmintier: Not necessarily; NREL is doing a higher-level analysis.
- In favor of cooling centers and the prioritization of DACs. Bring low-income communities up to capacity.
- Related to utilization analyses and the studies that have been done, how much energy are people utilizing across different demographic groups, and what would those that are underutilizing energy need to use to be at a level playing field compared to the average user?
 - Bryan Palmintier: This is beyond the scope of what NREL is doing in this part of the study. NREL is coming from a grid integration systems angle and will use this feedback to make comparisons.
- For in-home upgrades, upgrading to solar panels is a challenge for renters, and many homeowners often don't have roofs that will support the photovoltaic systems for solar. The cost to implement is greater for renters and those with incompatible roofs. It is important to consider the full cost of implementation.
 - Bryan Palmintier: NREL is capturing the renter/owner divide in the analysis.
- LADWP is far behind other utilities in all areas of distribution upgrades, especially on certain metrics and current progress. You have to look at the estimated time to repair. The LADWP field staff is understaffed, so that number is getting worse, especially in resilience events, and it takes a long time to get power back.
 - Bryan Palmintier: NREL wants to boost the importance of capturing those thought processes in the metrics.

Major Themes from Breakout Group 3

- The distribution grid today needs upgrades.
- Think beyond the cooling center and consider the other services that are required (e.g., charging, water purification) and what can get people from these hubs.

LA100 EQUITY STRATEGIES



Local Solar and Storage

Ashreeta Prasanna, Distributed Energy and Storage Analysis Researcher with NREL, overviewed some of the Steering Committee's feedback on local solar and storage (see slide 34 in Appendix). She shared that feedback included considering utility bill savings, particularly for renters, as a primary measure of success. Key takeaways for modeling, said Ashretta Prasanna, include designating utility bill savings across groups as a key metric. Additional feedback heard, she said, focused on financing, funding to pay utility bills, and subsidizing bills. She noted that NREL would include on-bill financing as part of the scenario analysis. Other feedback included recommendations against using rebates as they can be difficult to access and that shared community solar is a good option if compensation is equitable.

Ashreeta Prasanna asked Steering Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling.

Major Themes from Breakout Group 1

- How can carbon tax credits be monetized to offset costs?

Major Themes from Breakout Group 2

- What is non-rooftop local solar?
 - Ashreeta Prasanna: Solar systems that are canopies, ground-mounted, floating, or anything not on a rooftop.
- When NREL is looking at different financing pathways, is there also going to be an analysis of what is heard from the community and what is needed to reach target goals?
- We are getting ready to release requests for proposals (RFPs) on solar at Van Nuys airport.
- LADWP should consider keeping the feed-in tariff program going. It's not fully subscribed, but there is some limited capacity. That program can be expanded to encourage more solar.
- Energy storage at Los Angeles airports is a key interest.
- The challenge with local solar is that, in most cases adding local solar in low-income communities is more expensive than buying power directly. For example, installing local solar is \$0.10-\$0.20 per kW due to the cost of real estate, while desert solar is \$0.02-\$0.03 per kW. The cheapest alternative is for low-income communities to pay to buy solar in a purchasing pool.

Major Themes from Breakout Group 3

- Utility bill savings is an important metric.
- Renters in multifamily housing need access to community solar.
- Subsidies on bills are important.
- Compensation from community solar programs needs to be equitable where low-income community members see savings.
- What are your thoughts on non-profit organizations like [Grid Alternatives](#) that provide free solar systems for disadvantaged communities?
 - Ashreeta Prasanna: There are opportunities to partner with Grid Alternatives.
- A barrier for low-income communities to having solar is the condition of roofs.
- People are underutilizing energy, so the inclusion of solar can improve quality of life, but does that align with bill savings?



- Ashreeta Prasanna: Yes, communities can see bill savings even with increased use because of solar offsets.

Truck Electrification Air Quality and Health Impacts

Garvin Heath, Senior Environmental Scientist and Energy Analyst with NREL, overviewed Steering Committee feedback on truck electrification air quality and health impacts (see slide 35 in Appendix). Feedback focused on using multiple criteria in the analysis and the key takeaways for the modeling are to study several metrics to measure impacts on DACs and create a traffic-affected DAC definition. Garvin Heath noted other feedback for considering truck idling, freeway corridors, and port/airport air quality and health impacts. NREL focus would be on its analysis on neighborhoods most impacted by medium- and heavy-duty traffic. Additionally, Garvin Heath explained that the modeling would not focus on idling but on the movement of trucks through communities.

Garvin Heath asked Steering Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling.

Major Themes from Breakout Group 1

- Are there any representatives from the Port of Los Angeles in this group?
- Overlay the topic of tree canopy with this analysis.

Major Themes from Breakout Group 2

- The Los Angeles Cleantech Incubator (LACI) is currently doing a grant by the California Energy Commission to analyze the 710 freeway and is looking at similar metrics. They are trying to identify parcels where infrastructure can be added to electrify the freeways. LACI is interested in connecting with the project team.
- Where will infrastructure be located?
 - Garvin Heath: That is beyond the topic, but LADWP will want to hear about this. NREL is unsure how LADWP is looking at truck electrification corridors.
- Truck idling issues should be included in the modeling because South Los Angeles ranks in the top 95th percentile on CalEnviroScreen and is impacted by air pollution from traffic. Slauson is a major corridor and the whole 110 freeway is in South Los Angeles, with high levels of idling, which is a huge challenge due to traffic in Los Angeles. Is NREL considering idling in moving traffic, when trucks are moving in lanes, but traffic is stop-and-go?
 - Garvin Heath: When NREL says that "idling" will not be included in the modeling, it is because NREL defines idling as a truck that is stationary in a parking location. Trucks that are in lanes of traffic and are moving slowly because of heavy traffic are not considered to be idling.

Major Themes from Breakout Group 3

- Truck idling affects residential neighborhoods, as does dumping.
- Is someone from the Port of Los Angeles on the LA100 Equity Strategies Advisory Committee?
 - Simon Zewdu: Yes. LADWP is also in discussion with City of Los Angeles departments focused on tree canopies and how this may relate to air quality.

Transportation

Alana Wilson, Mobility Researcher at NREL, overviewed some of the Steering Committee feedback heard on electric vehicles (see slide 36 in Appendix). She noted that Steering Committee members highlighted the need to address EV affordability and EV supply

LA100 EQUITY STRATEGIES



equipment access. As a result, Megan Day stated that NREL plans to model new and used EV adoption, home/work charging access, and home readiness. She shared that the Steering Committee also recommended a "use" metric to capture affordability, range, parking, and access. The EV research team at NREL plans to include adoption and use rates in their modeling.

Alana Wilson asked Steering Committee members to consider what is missing from the input shared and if the key takeaways identified by NREL are the right things to be studying and modeling.

Major Themes from Breakout Group 1

- Will you be modeling potential policy changes? Gavin Newsom has a 2035 initiative, and the City of Berkeley does as well, regarding electric vehicle supply equipment.

Major Themes from Breakout Group 2

- This comment applies to heavy- and light-duty vehicles. LADWP is behind in distribution upgrades at both higher and lower voltages. The City of Los Angeles needs significant upgrades to serve demand in general, let alone for DACs, which is a key problem.
- Another consideration would be the California Air Resources Board (CARB) standards and how that factors into this.
 - Alana Wilson: NREL will see if that's on the list of policies to consider.
- Los Angeles International Airport is trying to figure out how to do charging to meet the CARB standards, especially Level 3 charging, and is working on an RFP for up to 50 chargers to spur zero-emission transportation network companies (TNCs) coming to LAX.
- I want to echo the takeaway on avoided energy use and the mitigated damage on new and used EV adoption and access. Can you expand on that?
 - Alana Wilson: NREL is looking at different levels of incentives for both new and used vehicles, and what the associated adoption rates might be. We are asking if the current level is adequate for the target population. NREL is doing a sensitivity analysis and what equitable distribution would look like for charging access.
- For these incentives, are these rebates for purchase?
 - Alana Wilson: Yes, these are the purchase incentives and rebates LADWP manages, and also the charging purchases.
- The South Coast Air Quality Management District (SCAQMD) has the Indirect Source Regulation for Warehouses over 100,000 sq. ft. One way to comply with this regulation is to purchase EV trucks.
- For the NREL EV modeling, be aware of an LADWP presentation to the LADWP Board of Commissioners on sub-transmission and distribution upgrades needed for expanded EVs.
- In addition to rebates for electric vehicles, add a consideration for e-car rentals.

Major Themes from Breakout Group 3

- Consider car sharing programs at public housing sites and expanding e-bikes to provide access to low-income residents.
 - Alana Wilson: NREL is excited to see that trend and are thinking about how to capture the phenomenon in the analysis.
- Want to see immediate benefits for Hispanic communities (e.g., e-bikes and others).
- What does long-term EV adoption look like when EVs are affordable (<\$20,000)?
 - Alana Wilson: NREL will follow up regarding Los Angeles' mode shift target, anticipated feasibility, etc.



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LA100 EQUITY STRATEGIES



Wrap-Up and Next Steps

Joan Isaacson shared that the upcoming Community Meetings for the Strategic Long-Term Resource Plan (SLTRP) will take place on August 30, September 1, and September 7 from 6:00 – 7:30 p.m. and that more information can be found at the SLTRP website. The next Advisory Committee meeting will take place virtually on October 26, 2022, and subsequent meetings will occur monthly on the fourth Wednesday of each month from 10:00 a.m. – 12:00 p.m. She explained that October agenda items will include the medium- and heavy-duty vehicle air quality and health emissions impact modeling approach, workforce development, and the household energy modeling approach.

Simon Zewdu thanked everyone for their continued participation and insights as part of LA100 Equity Strategies, noting the importance of Advisory Committee members communicating with the project team between meetings. Lastly, Simon Zewdu thanked members for their time.



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LA100 EQUITY STRATEGIES



Appendix

Advisory Committee Meeting #5
August 24, 2022
Presentation Slides



LA100 EQUITY STRATEGIES

**LA100 Equity Strategies
Advisory Committee Meeting #5
August 24, 2022**



UCLA

Los Angeles Department of Water & Power (LADWP)

Project Leads



Simon Zewdu

Director

Transmission Planning,
Regulatory, and Innovation Division



Pjoy T. Chua, P.E.

Assistant Director

Transmission Planning, Regulatory,
and Innovation Division



Steve Baule

Utility Administrator

LA100 Equity Strategies Oversight
& UCLA Contract Administrator



Stephanie Spicer

Community Affairs Manager



Agenda

Start Time	Item
10:00 a.m.	Welcome
10:05 a.m.	Meeting Purpose and Agenda Overview
10:10 a.m.	Energy Affordability and Policy Solutions Analysis
11:00 a.m.	Breakout Group Discussions: Key Takeaways from Steering Committee for <i>Modeling, Analysis, and Strategy Development</i>
11:55 a.m.	Wrap Up and Next Steps



Our Guide for Productive Meetings



Raise your hand
to join the
conversation
(less chat
entries, more
talking)



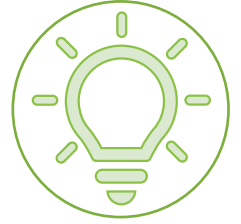
Help to make
sure that
everyone has
equal time to
contribute



Keep input
concise and
focused so that
others have
time to
participate



Actively listen to
others to
understand their
perspectives



Offer ideas to
address others'
questions and
concerns



Energy Affordability and Policy Solutions Analysis

Greg Pierce, Rachel Sheinberg and Paul Ong
UCLA Luskin Center for Innovation (LCI)
UCLA School of Law
UCLA Center for Neighborhood Knowledge



Affordability, rates and revenue

Customer affordability is among the most key considerations identified throughout the LA 100 ES process, and broader LADWP equity conversations

- The LA 100 transition cost necessitates additional utility *revenue*
- Revenue is primarily recovered through *rates* paid by customers
- Affordability refers to customers' ability to pay their bill, the bulk of which reflects rates
 - Rate (re)design is a primary but not the only affordability policy instrument
 - Folding in of building and transport electrification costs into LADWP bill heightens affordability concerns



LCI's Three Affordability Analyses

Task 1. Structural and Baseline Affordability Considerations

- Assembling existing data sources to assess structural energy affordability and considerations for households across LADWP territory and utility itself

Task 2. Energy Affordability Metrics

- Identifying and analyzing goals and metrics to inform actionable plans

Task 3. Energy Affordability Policy Options

- Identifying and analyzing priority policy options to inform actionable plans

Deliverables

- Each task will result in the equivalent of a report chapter, as well as briefs



Methods and Approach

General Approach

- LCI is synthesizing data from 4 types of sources: existing quantitative data, academic literature, published reports, and stakeholder input
- Complements NREL modeling emphasis, UCLA Law rate structure focus

Goals

- Focus on fewer, meaningful goals and policies, building on internal efforts
- Work with partners to set up a long-term data, analysis, and strategy architecture
- Consider but do not be entirely constrained by legal challenges



Baseline Affordability Considerations

Guiding Research Questions

- What do we (not) know about the transition cost and its impact on rates?
- What are the implications of current rate/bill structure for in-need customers?
- What are prevailing consumption/billing levels among in-need customers?
- What is general and specific points of in-need customer satisfaction with LADWP?
- What is prevailing enrollment in assistance programs among in-need customers?
- Are there barriers to procedural equity in assistance program enrollment?
- What is the ability of in-need customers to maintain thermal comfort?
- How do tenant-landlord split incentives affect customers now and in the transition?



Baseline Affordability Considerations

Data Sources

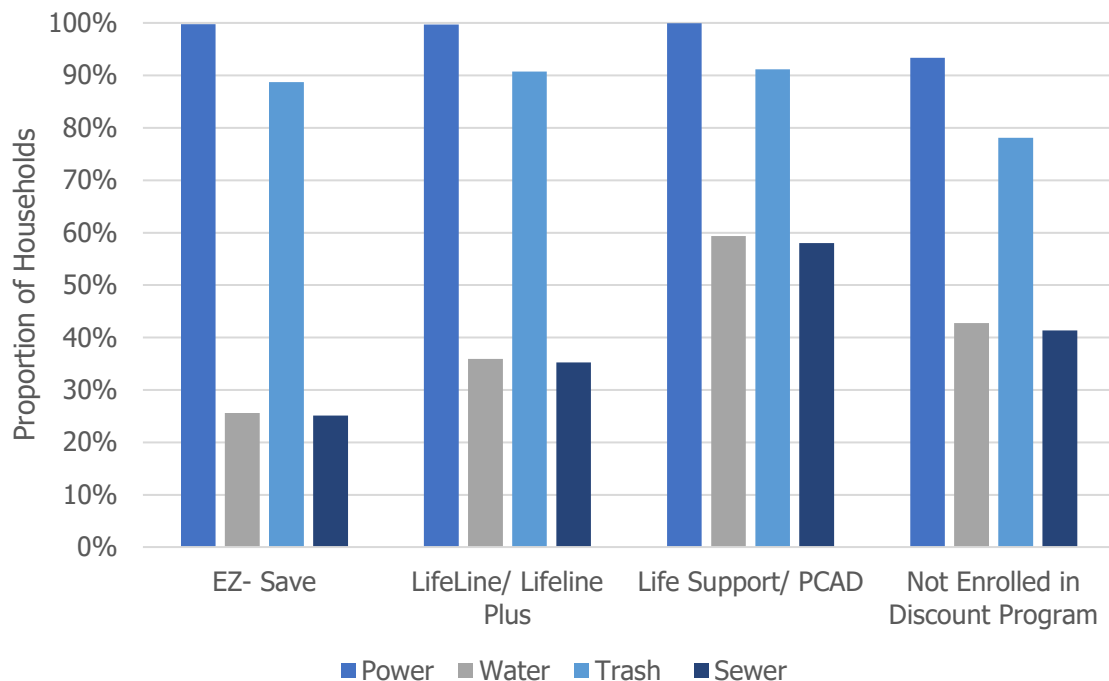
LCI is using available, representative or census-type data sources that support this assessment, including:

- Survey data from Loyola Marymount University and UCLA
- The California Energy Commission's RASS,
- LADWP CSD Service and Program Enrollment Data,
- The UCLA CCSC Energy Atlas (pending)
- NREL Model data (pending)
- OPA, City Controller several other recent city focused reports



Considerations: Whole Bill Matters

Types of Services Customers Pay for by Discount Program

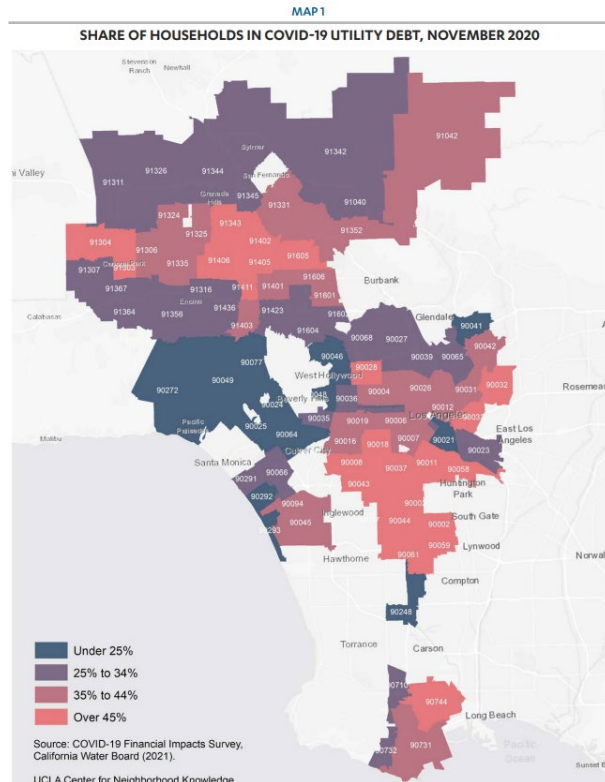


- The whole bill matters for affordability
- There are 15 combinations of the 4 services that can be on an LADWP bill
- The most common are:
 - Power only
 - Power & trash
 - Power, water, sewer & trash

Source: Calculation based on LADWP Service and Program Enrollment Data



Considerations: Inequitable debt burden

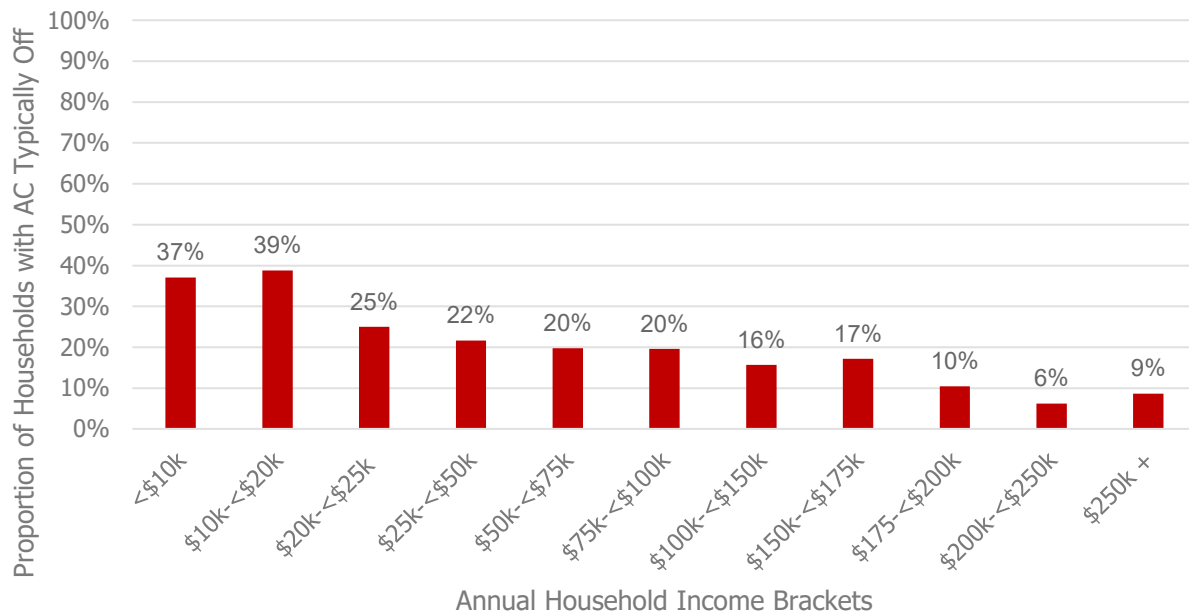


Source: Keeping the Lights and Water on: Covid-19 and Utility Debt in Los Angeles' Communities of Color (2021). Silvia R. González, Paul M. Ong, Gregory Pierce, and Ariana Hernandez. UCLA Centers for Neighborhood Knowledge and Luskin Center for Innovation



Considerations: AC Under-Consumption

LA City Households Not Using AC in the Evenings, By Income

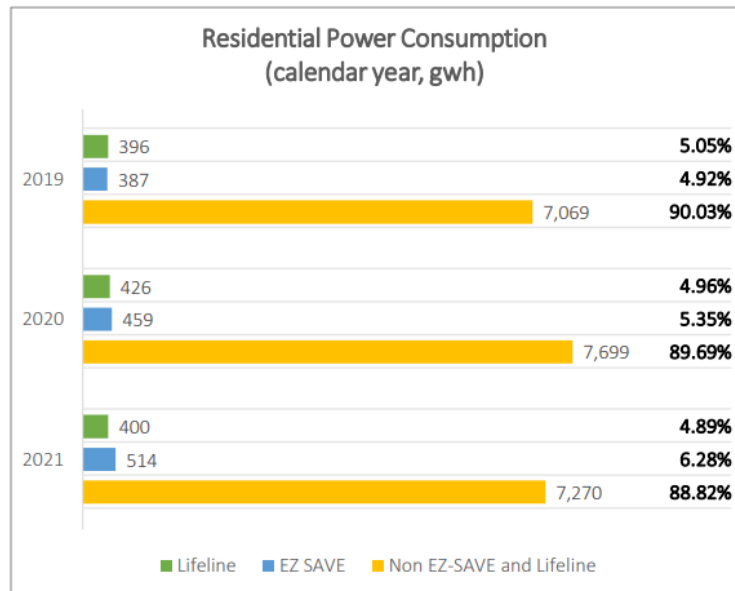
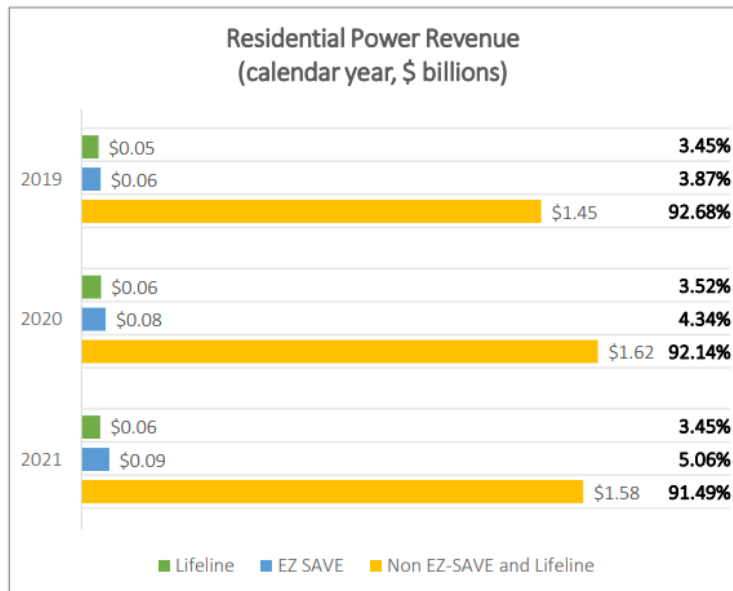


Source: CEC's 2019 Residential Appliance Saturation Survey (RASS)



Considerations: Revenue Impacts

Power Revenues and Consumption

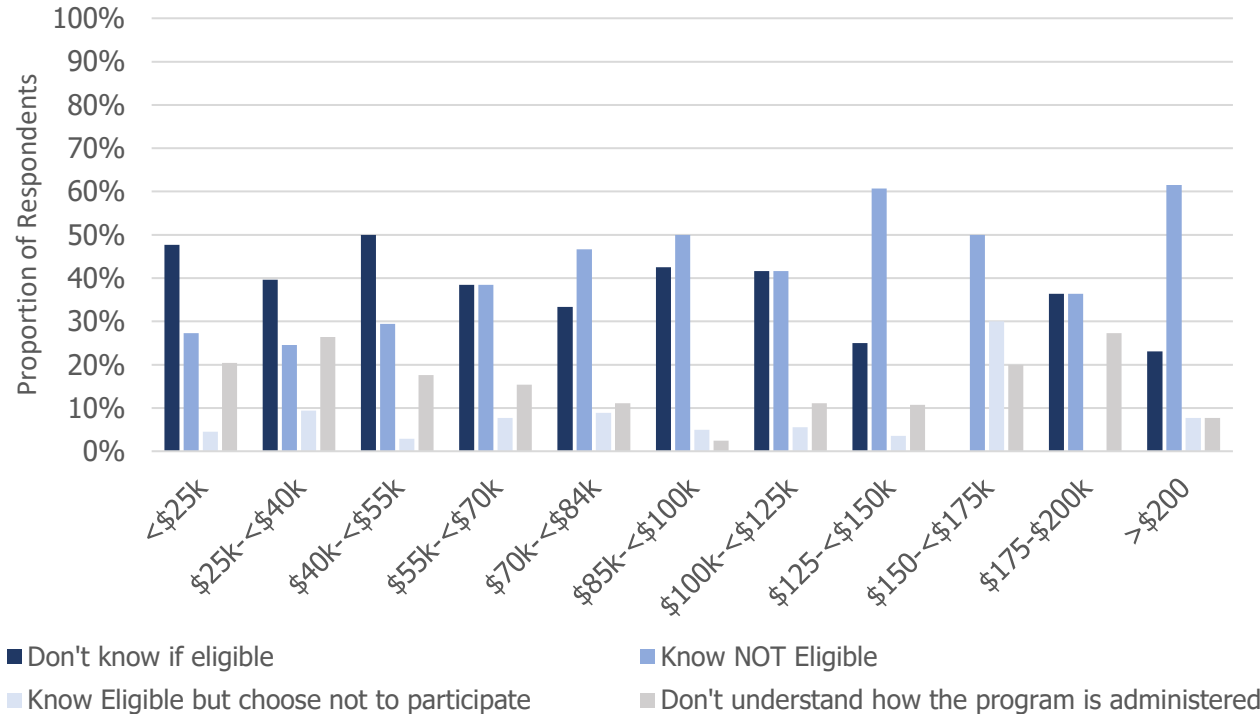


Source: LADWP CSD and FSO Estimate



Considerations: Program Barriers

Reasons for Not Participating in Discount Programs by Income



Source: Loyola Marymount University Survey Data



Metrics in 1st stage analysis

Concept	Description (potential goal)
Bill discount enrollment	30% discount on electricity portion of LADWP bill
Electricity burden/ Percentage of Income Payment Plan	Limit “in need” household expenditure on electricity to 4- 6% of pre-tax income
Household-based energy budget	Lowest rate tier set at level above necessary household consumption level
Shutoffs due to non- payment	Reduction or elimination in residential customer shutoffs
Thermal comfort	# of households reporting they can(not) keep their indoor space cool
Rating of electricity service based on cost	# of in-need households rating their service as ‘poor’ on cost basis
Electricity Insecurity	# of households reporting they need to make tradeoffs between paying electric bill and other essential services
Electricity use intensity	Unclear precedent. Helps get at equitable efficiency and use v. end service disparities

- **Analyzed by:** example goals, magnitude of impact addressed, impact ability, implementation and tracking feasibility, downsides, and precedents
- **Data:** academic literature, report review, and precedent of use by other utilities
- **Next steps:** narrow to 2-4 metric concepts for deeper analysis



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- **Next steps:** narrow to 2-4 metric concepts for deeper analysis



Metrics Discussion

- Which metrics are a priority to consider to track progress on affordability?
- Are there metrics which we missed, or should be discarded?



Policy Categories in 1st-Stage Analysis

- **8 policy categories analyzed by:** policy mechanism, LADWP offerings and other relevant policy models, barriers to enrollment and scaling up, and impact of policy approach
- **Data:** primary data, academic literature, reports, and comparative utility offerings review (alongside Law analysis)
- **Next steps:** narrow to 3-5 policy options for deeper analysis



Policy Categories in 1st-Stage Analysis

Policy/Program	LADWP Offerings	Barriers to Enrollment/ Scaling	Magnitude of Impact
Appliance Energy Efficiency			
Structural Energy Efficiency			
Demand Response			
Direct Assistance and Crisis Relief			
Microgrids			
Rate and Billing Design			
Community Solar			
Rooftop Solar and NEM			



Affordability priorities for stage 2 analysis

(Results of UCLA polling @ July Steering Committee)

Ranking	8 Metrics (16 responses)	8 Policies (11 responses)
Most popular	<ul style="list-style-type: none">• Shutoffs due to non payment• Bill discount enrollment	<ul style="list-style-type: none">• Direct assistance and crisis relief• Rate and billing design• Structural efficiency
Moderately popular	<ul style="list-style-type: none">• Thermal comfort• Electricity insecurity	<ul style="list-style-type: none">• Community solar
Mixed opinion	<ul style="list-style-type: none">• Electricity burden• Household-based energy budget	<ul style="list-style-type: none">• Rooftop solar• Appliance efficiency
Least popular	<ul style="list-style-type: none">• Rating of electricity based on service cost• Electricity use intensity	<ul style="list-style-type: none">• Microgrids• Demand response



Policies Discussion

- Which policies are a priority to consider to effect progress on affordability?
- Are there policy options which we missed, or should be discarded?
- What type of further analysis would you like to see on the prioritized policies and metrics?



Rate Structure Analysis for Affordability and Distributed Energy Access

Exploring Electricity Ratemaking for Affordability, Access, and DER Implementation

Lead: UCLA School of Law; Dr. William Boyd and Rachel Sheinberg

Goal: Inform how LADWP can implement and adapt to carbon-free energy in a way that does not further existing distributional injustices

Research Questions:

How can creative ratemaking be utilized to protect Low-Income residents from increasing energy costs?

How will LADWP's business model be impacted by increasing renewable penetration?

Tasks:

Create a high-level portfolio of rate design and utility financing strategies informed by other states' and countries' programs

Analyze impacts of potential rate structures on bills using the energy atlas and NREL modeling



Rate Structure Analysis for Affordability and Distributed Energy Access

Discussion Questions

Are there affordability programs that have been mentioned today or from other utilities that we should explore further?

How do you think that rate structures such as time-of-use pricing, where electricity cost varies throughout the day, would be received by your communities? Would a changing price create additional burden on residents?



Small Business Affordability

Assessing Energy Affordability Barriers and Opportunities for Ethnic Minority-Owned Small Businesses (MOBs)

Lead: UCLA Latino Policy and Politics Institute; Drs. Paul M. Ong & Silvia R. González
Leverages larger research project focused on California's ethnic businesses

Goal: formulate evidence-based policy recommendations that promote an equitable clean energy transition for racial/ethnic minority small businesses

Tasks:

1. Analysis of secondary and administrative data to identify minority-owned businesses to assess their current energy use
2. Assessment of participation in previous DWP energy savings programs
3. Design, test, and administer a survey of minority-owned businesses in Los Angeles with support from small business serving community-based organizations



Small Business Affordability

Assessing Energy Affordability Barriers and Opportunities for Ethnic Minority-Owned Small Businesses

Survey Data Collection

- **10-15 minutes**
- **Phone, internet, and in-person** in partnership with small business serving CBOs
 - Citywide
 - Prioritize ethnic economic enclaves
- **Key Modules**
 - COVID impacts and access to relief programs
 - Sustainability practices
 - Structural elements of energy burden



Small Business Affordability

Discussion Questions

- Are there particular issues facing minority-owned businesses which we should consider further examining?
- Are there other organizations that we should contact as part of the survey outreach effort?



Steering Committee Feedback

Highlights of feedback and takeaways for modeling, analysis, and strategy development



Breakout Group Discussions



An aerial photograph of a city, likely Los Angeles, showing a dense urban landscape with numerous buildings, streets, and green spaces. In the background, a range of mountains is visible under a clear sky. The image is used as a background for a presentation slide.

Would you add any other considerations?

Do you have thoughts on the feasibility of these pathways?

Do these align with your agency's initiatives and goals?

Buildings

Feedback

Success includes ensuring renters—particularly low-income renters—access upgrades, savings, and benefits (e.g., cooling, safe temperatures, safety).

Focus on the elderly and most vulnerable for excessive heat in homes. Frame as “thermal comfort,” not cooling.

Strategies should prioritize cooling deployment in heat island areas.

Do not penalize cooling when needed most.

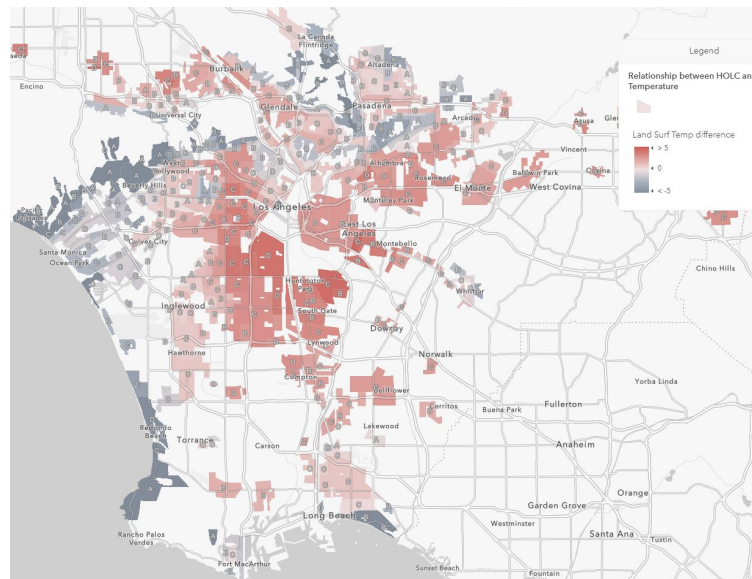
Key Takeaways for Modeling

Evaluate technology, billing, deployment strategies to increase access to home cooling, solar/storage, EV charging, energy efficiency in multifamily and renter-occupied buildings.

Focus on universal thermal health and safety by analyzing indoor temperatures under various scenarios, not just cooling system access.

Overlay thermal health and safety modeling results with heat exposure maps for program design prioritization.

Strategies will avoid penalizing lower-income households for using energy to maintain safe temperatures when it's hot or cold



Source: *The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas.* <https://www.mdpi.com/2225-1154/8/1/12/html>
Map: <https://www.arcgis.com/apps/dashboards/73e329457b6644e7aef13ecce43c8d8>



Affordability and Rates

Feedback

Strategies should include:

- Income-adjusted rates
- Maximum bill as share of income
- Expanding existing program participation
- Technology-install approaches

Consider whole costs to the customer (i.e., trash, water, power, housing, and gas)

Consider household size—energy use increases with multiple families in same dwelling

Anticipate administrative barriers to income-adjusted rates (i.e., collecting income data)

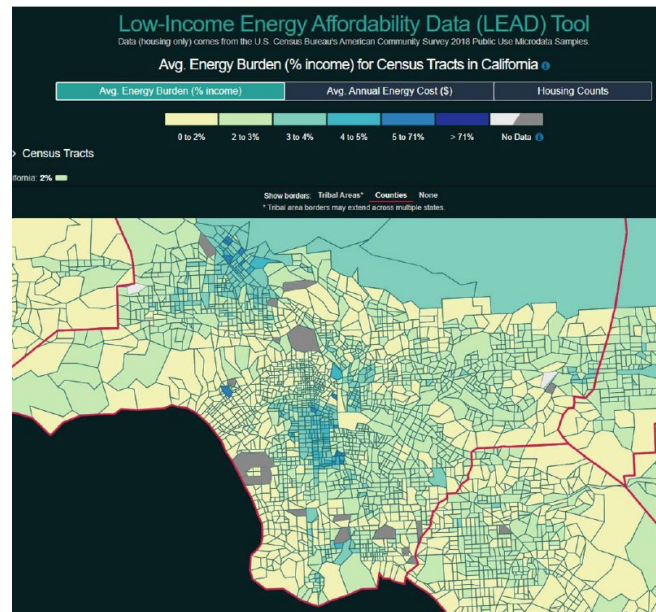
Key Takeaways for Modeling

Model suggested strategies

Include gas and water costs, explore feasibility of including trash services in final bill estimation and analysis.

Model adaptable retail tariffs that change based on number of people in the home

Model increased program costs due to administrative barriers



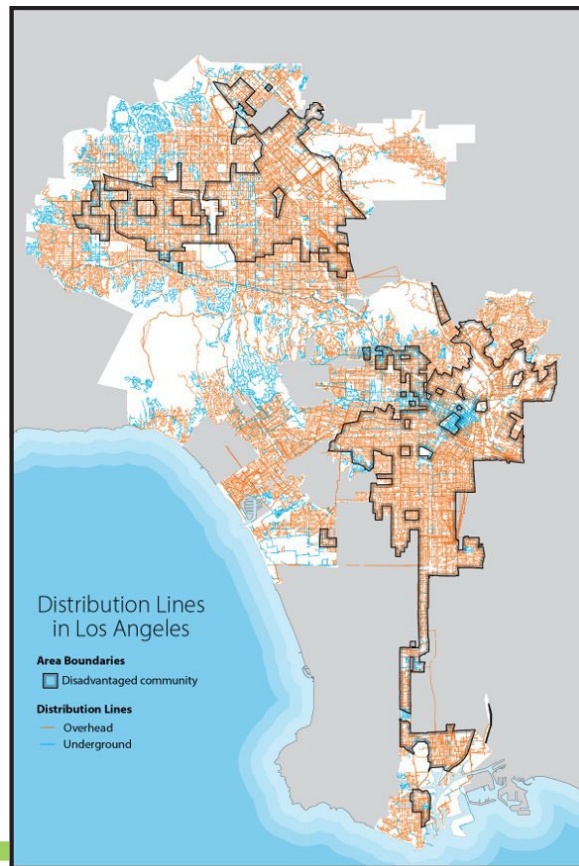
Source: Low-Income Energy Affordability Data Tool. Average Energy Burden (% income) for Census Tracts.

<https://www.energy.gov/eere/sls/maps/lead-tool>



Grid Reliability and Resilience

Feedback	Key Takeaways for Modeling
Note parts of the grid, especially in DACs, already require upgrades	Incorporate today's required upgrades with upgrade schedules that prioritize DACs
Prioritize resilience hub-type opportunities (e.g., community centers) for cooling, vehicle and phone charging, potentially water purification above "cooling centers."	In-home or other close-to-the-customer solutions will be prioritized.
Older electrical panels/wiring in disadvantaged homes is a bigger challenge than grid reliability.	Include scenarios with and without electrical panel upgrades as part of the scenario sets.



Local Solar and Storage

Feedback

Consider DAC utility bill savings, particularly renters, as a primary measure of success.

Financing, funding to pay the utility bills, and subsidizing bills are options worth considering.

Don't use rebates; just lower the cost of installation.

Shared community solar is a good option if compensation is equitable.

Key Takeaways for Modeling

Designate utility bill savings across status groups as a key metric.

Include on-bill financing as part of the scenario analysis.

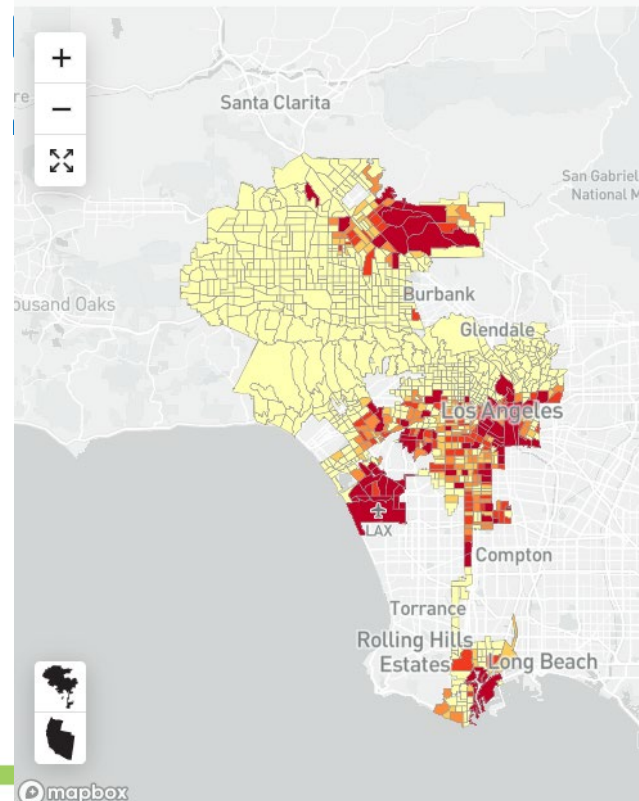
Rebates will not be considered. Incentives that lower the cost of installation will be considered in scenario analysis.

NREL will analyze the economics of community solar and siting options.

Non-Rooftop Local Solar Deployment Capacity (MW)

Early & No Biofuels - High (2045)

Current Resolution: Tracts



Truck Electrification Air Quality and Health Impacts

Feedback

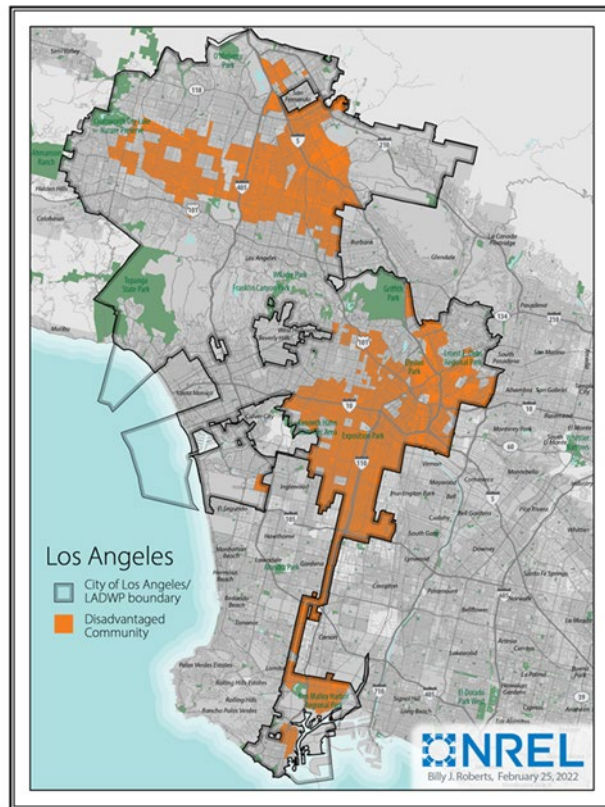
Use multiple criteria (e.g., air quality related to vehicle emissions, high rates of asthma) to prioritize areas to model

Consider truck idling, freeway corridors, and port/airport air quality and health impacts

Key Takeaways for Modeling

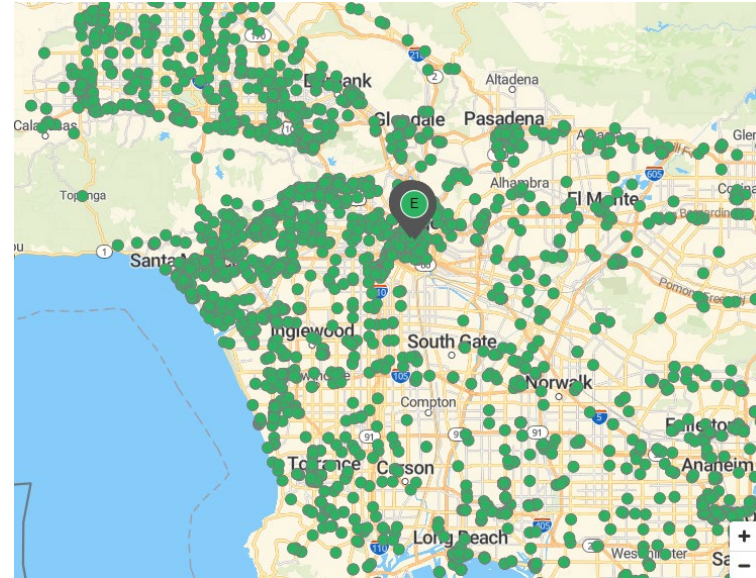
Study several metrics to measure impacts on disadvantaged communities (DAC) & create a traffic-affected DAC definition

Truck electrification analysis will focus on neighborhoods most impacted by medium- and heavy-duty truck traffic



Transportation (light duty vehicle focus)

Feedback	Key Takeaways for Modeling
Address electric vehicles (EV) affordability and EV supply equipment (EVSE) access	Model new and used EV adoption, home/work charging access, home readiness
Recommend “use” metric to capture affordability, range, parking, access	Include adoption and use rates
Interest in e-bikes and micromobility infrastructure, concern about limited impact on power consumption	Quantify avoided energy use to assess mitigated demand
Consider distribution system limitations on the transition to EVs	Model grid upgrades needed to support equitable electrification



Source: Alternative Fuels Data Center – Electric vehicle charging station locations.
<https://afdc.energy.gov/stations/#/find/nearest?location=los%20angeles,%20ca&fuel=EL>
[EC](#)



Wrap Up and Next Steps



Upcoming SLTRP Community Meetings



Advisory Committee Meetings

October 26, 2022
Virtual

- Air quality and health impact/medium- and heavy-duty vehicle emissions impact modeling approach
- Workforce development
- Household energy modeling approach

Discussion on December/January meeting date.

Subsequent Meetings

- **Fourth Wednesday of every other month, 10:00 a.m. – 12:00 p.m. PT**
- **Virtual** for near-term



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Thank you!
