



**LA100 Equity Strategies
Advisory Committee Meeting #8
April 26, 2023**



Los Angeles Department of Water & Power (LADWP)

Project Leads



Simon Zewdu
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LA100 Equity Strategies Oversight
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Stephanie Spicer
Community Affairs Manager



Agenda

Start Time

10:00 a.m. Welcome

10:05 a.m. Meeting Purpose and Agenda Overview

10:10 a.m. Key Finding and Strategies (NREL)

- Procedural and Recognition Strategies
- Distributional Strategies

11:00 a.m. Key Findings (UCLA)

- Affordability
- Ethnic Small Businesses
- Air Quality
- Jobs & Workforce Development
- Panel Upgrades

11:45 a.m. Next Steps for LADWP

12:00 p.m. Adjourn



Our Guide for Productive Meetings



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



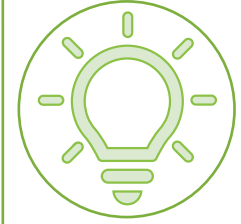
Help to make
sure that
everyone has
equal time to
contribute



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



Key Findings and Strategies

NREL



While all communities will benefit from the modeled LA100 clean energy scenarios, **improving equity** in participation and outcomes requires **intentionally designed equity strategies**.



The Challenge



A 100% TRANSITION REQUIRES BRINGING EVERYONE ALONG

Even those that can't afford it. Los Angeles County is home to 30% of the state's population living in poverty.

THE CURRENT ENERGY SYSTEM IS INEQUITABLE

Disadvantaged communities experience more burdens and fewer benefits of the energy system. An equitable transition will require major shift in how investments are allocated.

LEGISLATION CONSTRAINS RATE AFFORDABILITY

Inequity will increase as rates go up, but legislation prevents LADWP from meeting IOU affordability standards.

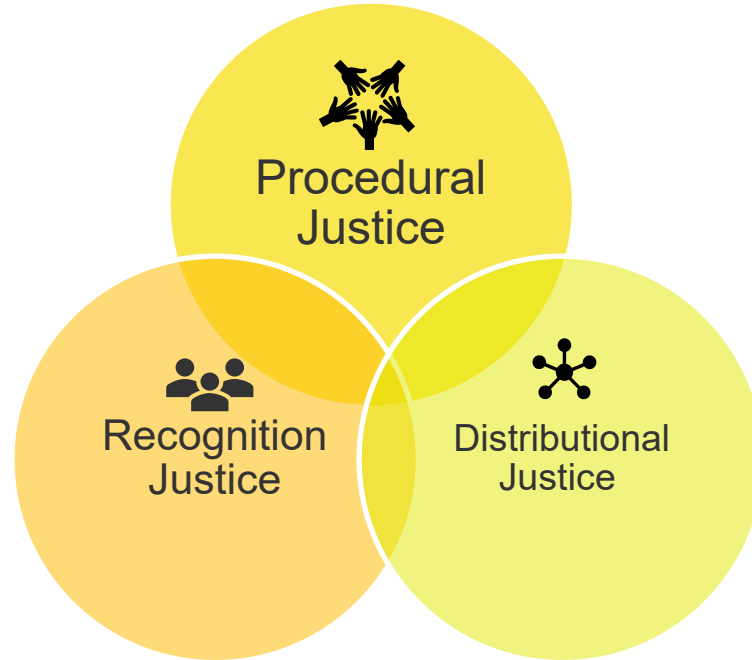
EQUITY REQUIRES COMMUNITY INVOLVEMENT

Underserved communities have not participated in decision making and are seeking greater involvement in solutions moving forward.

**LA100
Equity
Strategies
is organized
around
three tenets
of justice**

Enable **community leadership** in the process

Understand and address past and current energy inequities



Ensure **just and equitable distribution** of benefits and negative impacts of clean energy transition



Procedural and Recognition Strategies

Paty Romero-Lankao, NREL

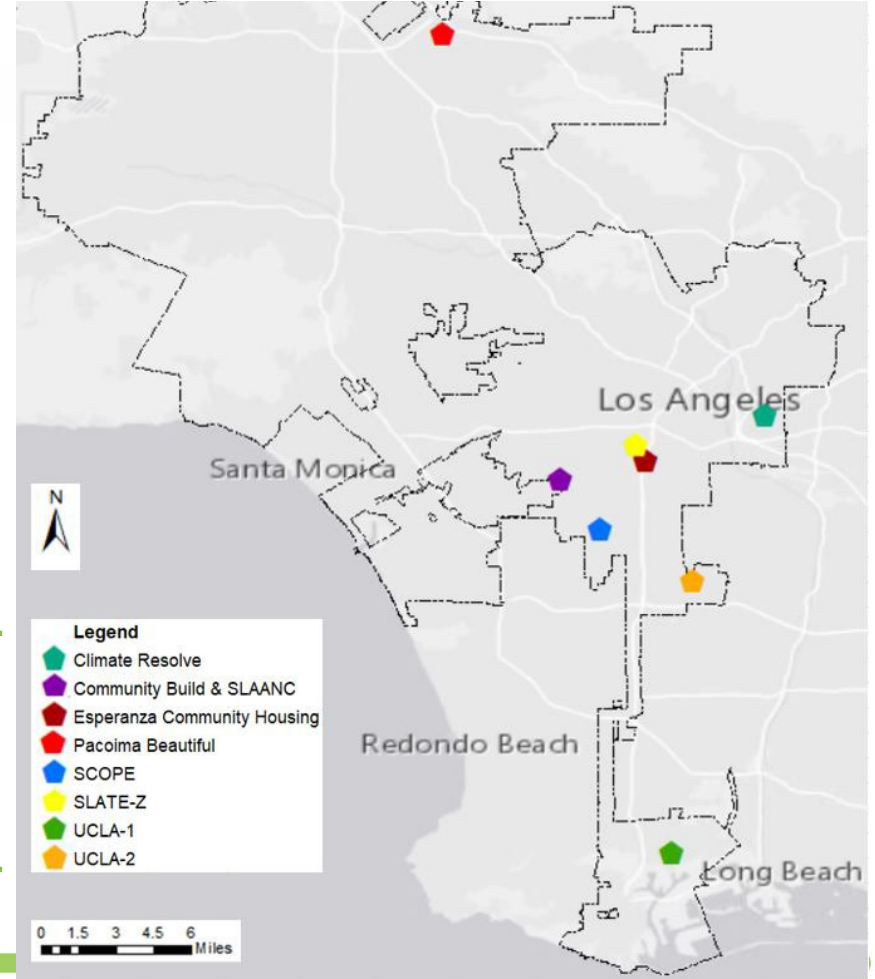


Community Guided Equity Strategies

- 1 Goals and Analytical Approach
- 2 Methods
- 3 Key Take Aways & Findings
- 4 Q&A



Map of In-Person Listening Sessions



Partners

1

Goals: Use Mixed-Methods Approach to

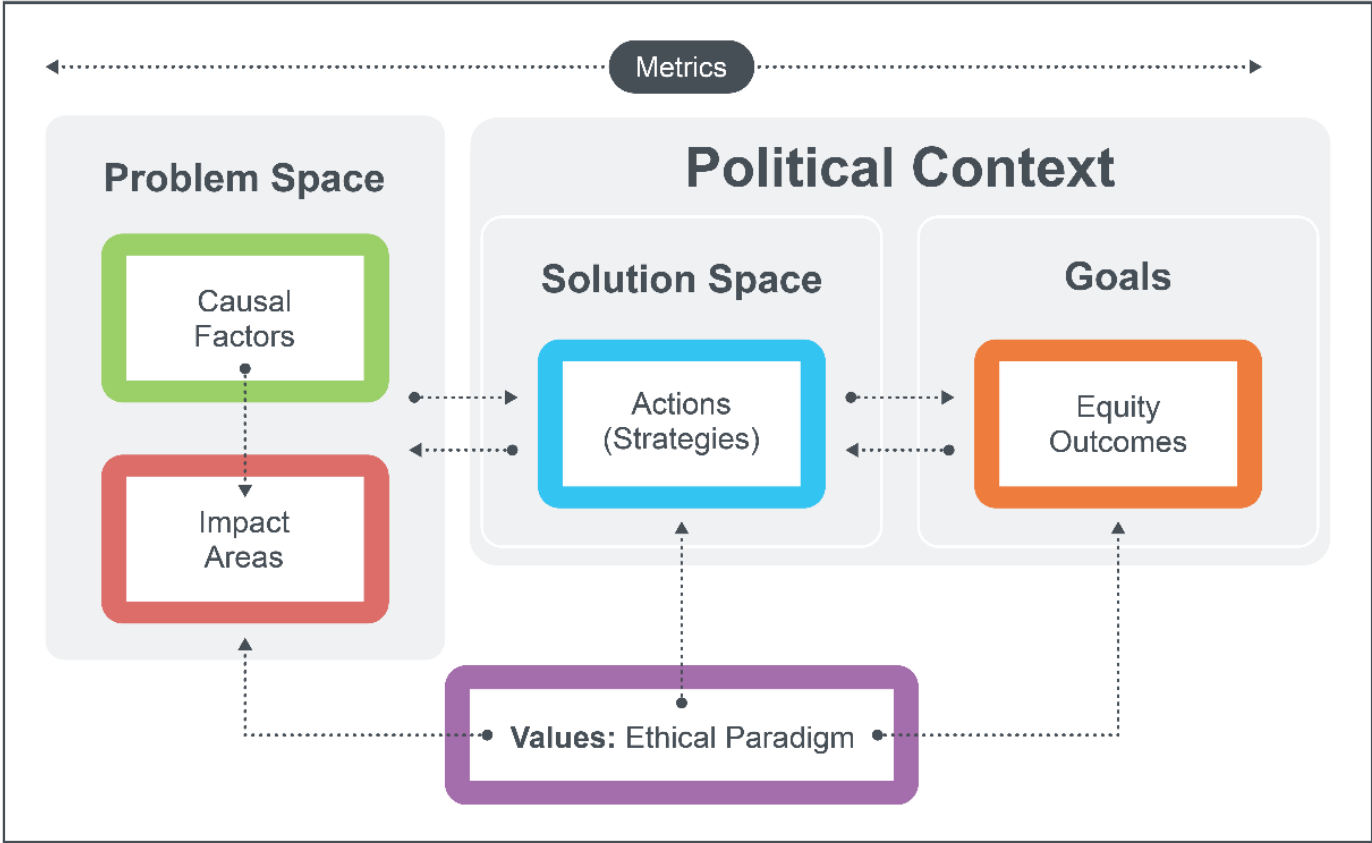
1. Examine community

- Identified problems and solutions
- Guided Energy Equity Strategies
- Operationalizing Recognition and Procedural Justice

2. Develop

- A road map for Energy Equity Strategy Development

Figure 1. Analytic approach for equity strategy analysis



2

QUALITATIVE DATA COLLECTION METHODS



139 total participants



5 representative regions

Round 1



5 listening sessions



36 virtual participants

Round 2



10 listening sessions



103 in-person participants

Activities



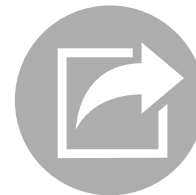
Partner with CBOs



Record, Transcribe & Anonymize



Categorize & Analyze



Share & Co-Design Actions

3 Key Take Aways & Findings



Toolkit

Social science analytic and engagement techniques



Roadmap

Community-guided equity strategy development



Finding 1

Socioeconomic, cultural & institutional – barriers are crucial



Finding 2

11 Equity Strategies target 5 priority areas & 7 energy equity outcomes



Key Findings: Procedural Justice

Problem Space

Top-down Decision Making

Lack of Transparency,
Continuity, Accountability

Mistrust, Grievance

Lack of Accessible & Usable
Information

Factors

Impacts

Solution Space

Entrust Communities with
Decision-Making Power

Continuous Transparent
Community Engagement Process

Active, Sustained Engagement in
Program Design, Implementation
& Evaluation

Community Identified Actions

Equity Outcomes

Improved:

- Accountability
- Responsibility
- Inclusive Decision-Making

Values: Ethical Paradigm

Energy Equity Strategy 1

Program & Service Co-development

*“...this is where the technology comes in. **For centuries we have been marked by redlining, they know which communities are most in need. And this is where [using] technology to our advantage comes. [To know where] to start, what places [need to] have access, obviously, [to pay for] the cost of a better life. And this [redlining] map was much earlier than technology.”***

Energy Equity Strategy 2

Tailored Outreach and Education

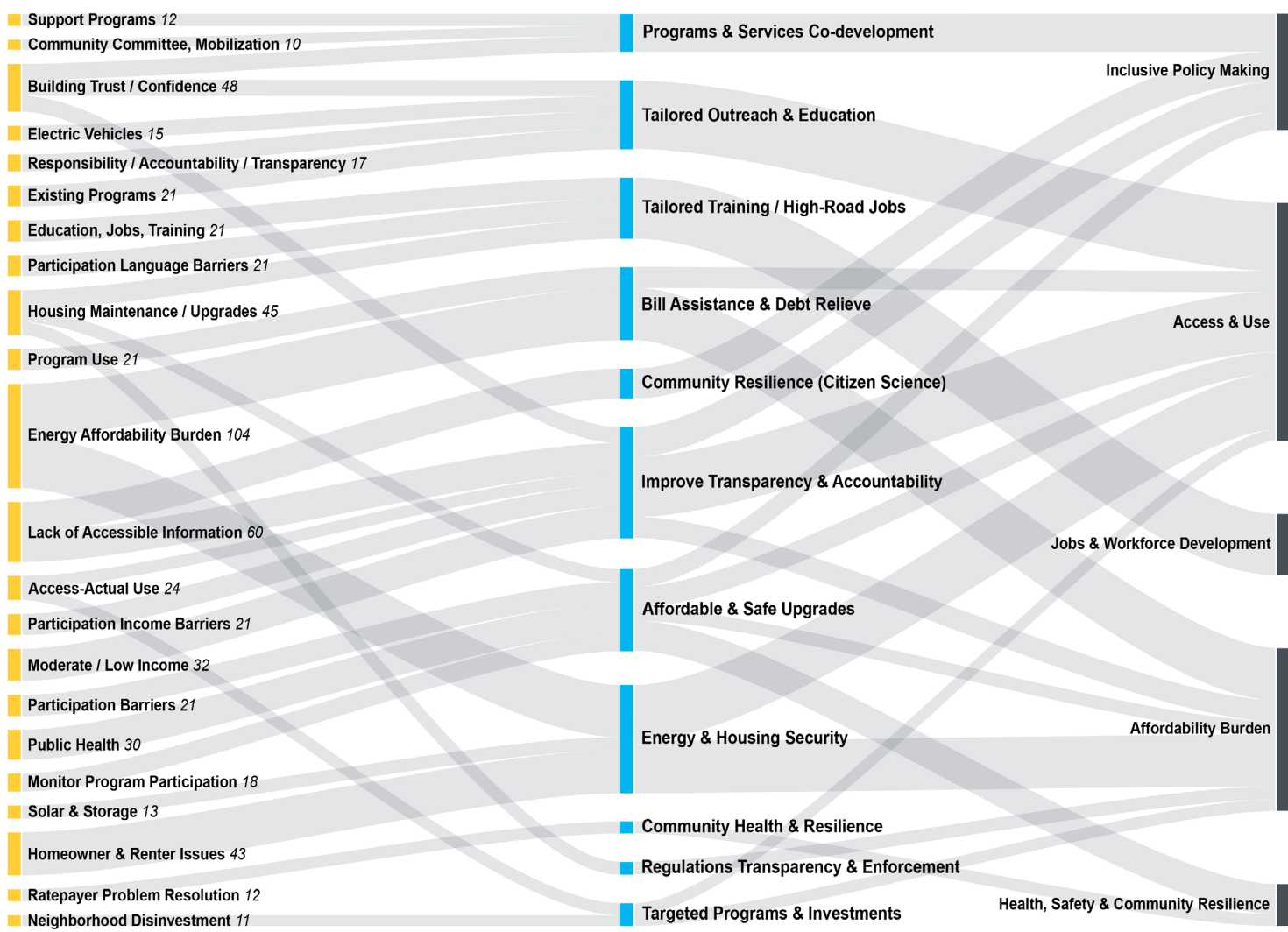
*“One strategy would also be—**what we’re doing right now—to provide educational opportunities for more people.** To help them reflect on how to avoid destroying our planet. [...]We are part of an environmental health committee, and we are promotoras. So, we go out onto the streets, we hand out flyers. We talk to people, helping them understand. **And you know that the promotora model works well because the community knows us. So, they trust us.** Here comes the lady who...let's see, tell us. **They listen to us. They have the confidence to tell us ‘it's true, you're right,’**”*

Energy Equity Strategy 11

Improve City Regulations, Accountability, and Enforcement

*“There’s a lot of barriers, especially with **old houses**, and Boyle Heights has a ton of old houses. Or they have houses that are old that were flipped. Like a friend of mine just bought a house on Lorena, and **the flipper just basically hid all the old stuff** in there and when he found out that basically it was a fire hazard for him to have these old electrical wires. ...**The regulations just aren’t there and there’s no support for families who can’t afford to fix these things.** And it’s not necessarily families’ faults that this is happening, or homeowners’ faults, or renters.”*

Strategy Development Analysis: Equity Strategies, Problem Space & Priority Areas



Key Findings: Recognition Justice

Problem Space

Historical Legacies Present in Current Policies & Practices

Intersectional Structural Factors Producing Current Inequities

Lack of Access to Financial Capital

Poor Quality & Maintenance of Infrastructure & Housing

Lack of Affordable Home Ownership

Factors

Impacts

Solution Space

Tailor Strategies for Debt Relief

Co-develop Eligibility & Expand Reach of Equity Programs

Redress & Repair Unsafe & Inefficient Infrastructure & Housing

Improve Regulation, Enforcement & Monitoring (Retrofits)

Community Identified Actions

Equity Outcomes

Improved:

- Program Access & Benefits
- Efficiency & Safety in Housing, Transport & Infrastructure

Values: Ethical Paradigm

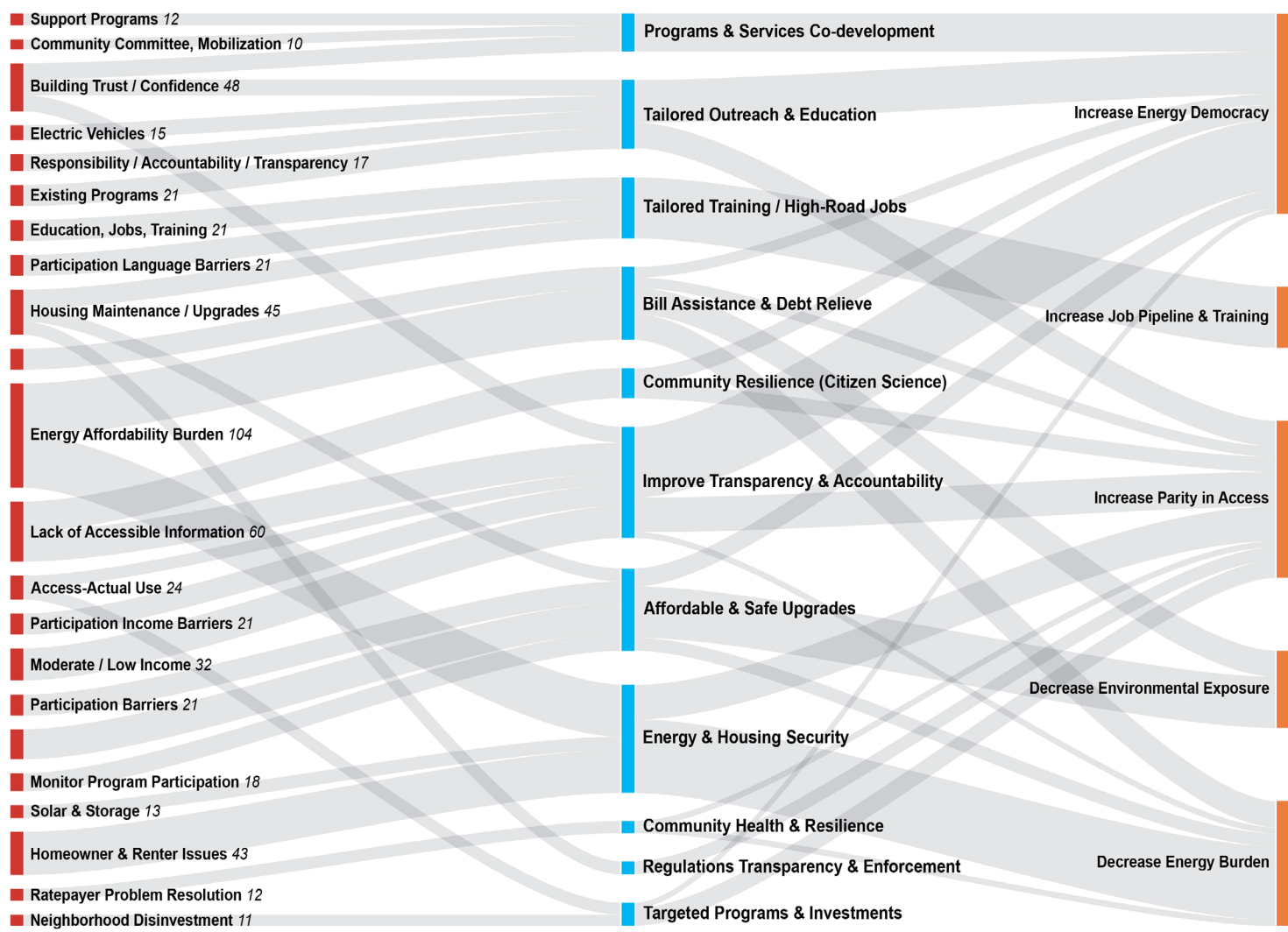
Energy Equity Strategy 7: Affordable & Safe Upgrades

*“I wonder if there is a plan to remediate some of the infrastructure that currently exists in South LA that is problematic, in terms of known adverse health outcomes...one thing is **capacity**. Does our infrastructure have the capacity to deal with these things. But...just in terms of - from what I understand from the community - there is a **sense of neglect**. In terms of the **outdated infrastructure that needs remediation**...I’m hearing **discussions about what are we going to do to fix, improve the infrastructure to make way for new**. But how are we going to remediate the old? And I think that's also about **building trust in the community**... Where is the **plan to remediate some of the things that currently are causing damage and have been causing damage for quite some time now?**”*

Energy Equity Strategy 4: Bill Assistance & Debt Relief

*“If the bill was split from...[the] starting of the pandemic, to where you said it's over. **If that bill was split between what you owe presently and then you work out a payment plan for people**, I think that it would be a win win, and then these improvements can happen, the bills still get paid, water and power does get their money, the people are satisfied. But I haven't seen it...when the pandemic happened 2.5 years ago, take what that number was to present when you said utility moratorium is over, stop it right there...”*

Strategy Development Analysis: Equity Strategies, Problem Space & Energy Equity Outcomes



4
Q&A



Thank
you!









Distributional Strategies

Megan Day, NREL



Distributional Strategies

NREL conducted modeling, analysis, and strategy development along prioritized pathways:








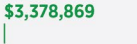




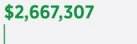









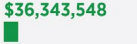




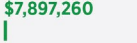




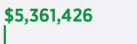












Affordability		Low-income energy bill affordability
Housing		Universal access to safe and comfortable home temperatures
		Housing weatherization and resilience to extreme events
Solar & Storage		Improved access to solar and storage for multifamily residents and renters
		Equitable community solar access and benefits
Transportation Electrification		Equitable transportation electrification – EVs, charging, and multimodal
Grid Reliability & Resilience		Distribution grid upgrades to enable equitable resilience and solar, storage, and EV access
Air Quality & Health		Truck electrification for improved air quality and health outcomes



Distributional Equity Baseline (1999-2021)

LADWP solar net energy metering and residential EV incentive programs disproportionately benefited households in non-disadvantaged, mostly White, non-Hispanic, owner-occupied, affluent neighborhoods.

Low-Income and Lifeline Programs appropriately provided subsidies to disadvantaged communities.

LADWP RESIDENTIAL INVESTMENTS			NUMBER OF YEARS	TOTAL AMOUNT SPENT	AVG. AMOUNT PER CUSTOMER DAC/Non-DAC	% OF INCENTIVES Normalized by # of Customers DAC/Non-DAC
SOLAR INSTALLATION	 Net Energy Metering Programs	 22	 \$340,604,541	 0.25 kW / 0.41 kW		
	 Home Energy Improvement Program	 3	 \$3,378,869	 \$3 / \$2		
ENERGY EFFICIENCY	 Refrigerator Turn-In and Recycle Program	 5	 \$2,667,307	 0.01 refrigerators / 0.014 refrigerators		
	 Consumer Rebate Program	 6	 \$93,248,144	 \$64 / \$74		
	 Other Non-Low-Income-Targeted Programs	 15	 \$36,343,548	 \$20 / \$34		
	 Low-Income-Targeted Program*	 5	 \$7,897,260	 \$11 / \$1		
ELECTRIC VEHICLES	 Incentive Programs	 8	 \$5,361,426	 \$2 / \$6		
CUSTOMER DISCOUNTS	 Low-Income Program*	 15	 \$173,633,204	 \$195 / \$64		
	 Lifeline Program*	 15	 \$313,424,782	 \$302 / \$164		

* Low-Income Targeted

Low-Income Energy Bill Affordability

Thomas Bowen, NREL

Christina Simeone, NREL



Rates and Affordability Key Finding

Continuing LADWP's existing rates and low-income assistance approach will increase electricity bills more for lowest-income customers than all customers and decrease affordability for low-income customers on all metrics examined.

Rate Equity Metric	A	B	C	E	F	G	H
	2019	2035					
	LADWP Baseline (w/EZ-Save)	LADWP BAU (w/EZ-Save)	2-Tier (CPUC)	LADWP BAU (w/CARE & FERA)	2-Tier (w/CARE & FERA)	2-Tier (w/IBFC)	2-Tier (w/IBFC, CARE & FERA)
Average Monthly Bill (All Households)	\$ 93.46	\$ 110.95	\$ 110.96	\$ 110.95	\$ 110.96	\$ 110.96	\$ 110.96
Average Monthly Bill (Low-Income, <\$20k)	\$ 70.08	\$ 89.03	\$ 91.26	\$ 65.62	\$ 63.24	\$ 38.54	\$ 26.81
Transfer Cost (Assistance Program Cost as % of Total Residential Revenue Requirement)	1.53%	1.36%	0.00%	10.58%	10.30%	0.00%	6.59%
Average Annual Electricity Burden (All Households)	3.54%	4.29%	4.25%	3.60%	3.45%	2.75%	2.31%
Average Annual Electricity Burden (Low-Income, <\$20k)	13.66%	16.69%	16.69%	12.79%	12.04%	7.59%	5.34%
Households Over 100% Electricity Burden (Number of Households)	4,249	6,367	6,998	4,791	4,917	4,287	3,909
Average Monthly Hours Worked at Minimum Wage for an Average Month (All Households)	4.74	5.63	5.63	5.63	5.63	5.63	5.63
Average Monthly Hours Worked at Minimum Wage for an Average Month (Mid-Income, \$20k-\$50k)	4.18	4.95	4.84	4.06	3.94	4.03	3.28
Average Monthly Hours Worked at Minimum Wage for a Low-Cost Month (Low-Income, <\$20k)	2.92	3.51	3.45	2.64	2.39	1.46	1.02
Average Monthly Hours Worked at Minimum Wage for an Average Cost Month (Low-Income, <\$20k)	3.56	4.52	4.63	3.33	3.21	1.96	1.36
Average Monthly Hours Worked at Minimum Wage for a High-Cost Month (Low-Income, <\$20k)	4.59	5.97	6.91	4.33	4.78	2.91	2.02
Average Annual Net Energy Return (All Households)	\$ 106.07	\$ 91.45	\$ 103.35	\$ 85.95	\$ 96.51	\$ 63.57	\$ 66.37
Average Annual Net Energy Return (Mid-Income, \$20k-\$50k)	\$ 47.13	\$ 41.74	\$ 46.28	\$ 50.04	\$ 58.31	\$ 41.57	\$ 54.46
Average Annual Net Energy Return (Low-Income, <\$20k)	\$ 18.89	\$ 16.22	\$ 14.29	\$ 17.82	\$ 21.11	\$ 31.75	\$ 46.32

Rates and Affordability Equity Strategies



Baseline Equity

- LADWP low-income and Lifeline programs appropriately benefited disadvantaged communities.
- LADWP has low enrollment (<17% of residential class) and low bill discounts (\$8/month in 2019) compared to investor-owned utility assistance programs.
- LA County has a higher concentration of low-income population (30%) than any other California county, increasing the need for effective low-income assistance.

Community Solutions Guidance

- Focus on affordability as the highest priority.
- Reassess how to measure eligibility and burden and expand eligibility for moderate-income households.
- Low-income ratepayers and seniors suggested subsidies, free aid, and other support instruments to address communities' inability to pay electricity bills.

Modeling & Analysis Key Findings

- Combining CPUC-recommended two-tier rate design with CARE and FERA assistance program approaches yields a 29% reduction in monthly electricity bills for lowest-income customers, a 20% reduction in energy burden for all customers, and a 28% reduction in energy burdens for lowest-income customers compared to BAU.
- Income-Based Fixed Charges (IBFC) deliver the most improved affordability for low-income households at no program cost.
 - \$50/month low-income bill decrease.
 - Electricity burden drops from 16.7% to 7.6% for low-income households.
 - IBFC are a theoretical rate construct, not a common practice.

Equity Strategies

- A CPUC-recommended two-tier rate design with no low-income assistance program results in no transfer costs across residential customers and results in similar affordability outcomes to the existing rate design with the EZ-SAVE program.
- Combining LADWP's existing rate design with low-income assistance approaches modeled after the CPUC's CARE and FERA programs improves low-income bill affordability compared to the EZ-SAVE program.
- Converting to a two-tier CPUC-recommended rate design and income-based fixed charges results in a 57% reduction in electricity bills for lowest-income customers, and 36% reduction in energy burden for all customers.

Housing weatherization and resilience to extreme events

Universal access to safe and comfortable home temperatures

Katelyn Stenger, NREL

Philip White, NREL

Noah Sandoval, NREL

Tony Fontanini, NREL

Ry Horsey, NREL



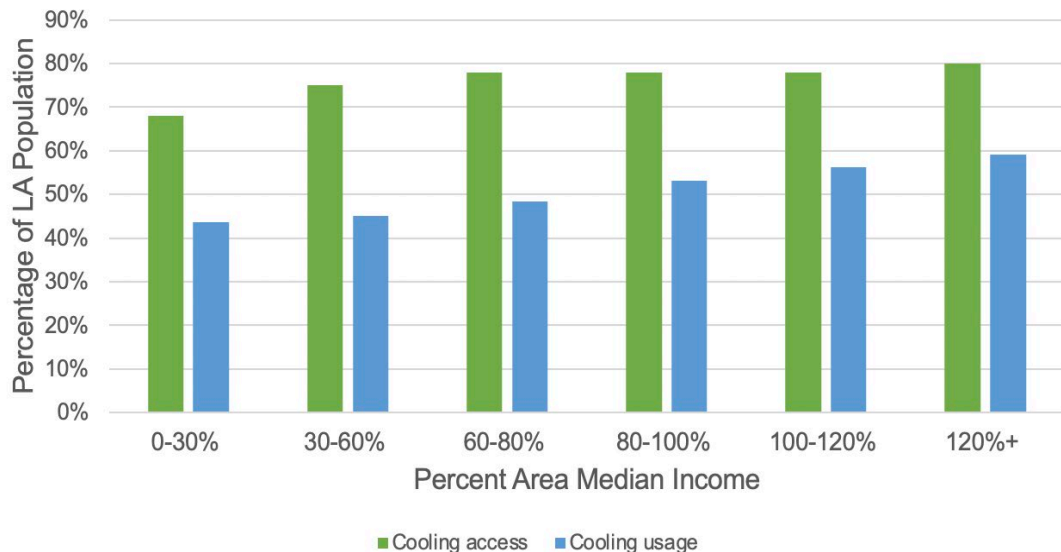
Housing Resilience Equity Key Finding

Less than 50% of low-income households in LA (0-80% Area Median Income) use cooling. More than 30% of extremely low-income (0-30%) households lack access to cooling.

Multifamily renters experience the highest dangerous heat exposure in LA, starting a simulated summer emergency electricity outage at dangerous temperatures.

Weatherization reduced dangerous heat exposure in single-family homes but was not as effective in reducing exposure for multifamily homes.

Cooling use and access most effectively eliminated dangerous heat exposure by enabling multifamily homes to start an outage at safe temperatures.



Safe and Comfortable Home Temperatures Key Finding

Under existing housing conditions, more than half of low-income households will experience dangerous indoor air temperatures of 95°F at least once a year by 2035.

Adding cooling nearly eliminates dangerous temperature exposure for low-income and all households.

Households with existing cooling save on utility bills when upgraded to heat pump cooling.

Upgrade	Low-income 0–80% AMI	Moderate-income 80%–120% AMI	Higher-income 120%+ AMI
Baseline	1,652	1,188	945
Cooling Use	1	0	0
Cooling Use, Cool Roofs, and Shading	1	0	0
Cooling Use and Low-Cost Envelope Improvements	1	1	1
Cooling Use and Title 24 Envelope Improvements	2	1	1

Modeled average hours above 86°F by income and scenario (2035)



Housing Equity Strategies



Baseline Equity

- Less than 50% of low- and moderate-income households use cooling. More than 30% of extremely low-income households lack access to cooling.
- LADWP residential energy efficiency investments analyzed disproportionately benefited non-disadvantaged, mostly White, mostly non-Hispanic, mostly home-owning, and mostly above-median- income communities.
- Many disadvantaged communities, including much of South LA, did not receive LADWP energy efficiency incentives proportional to their population.

Community Solutions Guidance

- Ensure LADWP-supported improvements do not increase rents or cause displacement.
- Transparent explanation of benefits and costs of weatherization measures
- Simplified application materials and methods.
- Deliver benefits to moderate-income, renter, and energy-burdened households and households in multifamily housing.
- Consistent disadvantaged customer support for safety and comfort maintenance and efficiency upgrades.
- Funded, staffed, culturally informed, and consistent outreach and communication through door-to-door, promotora-type approach

Modeling & Analysis Key Findings

- Low-income multifamily building renters have the highest exposure to dangerous temperatures in an outage.
- Cooling access and use before an outage decreases extreme heat exposure by 34%, increases the average hours until unsafe temperatures to 15, and decreases exposure to similar levels in single-family and multifamily homes.
- Combining cooling use with robust envelope improvements decreased exposure to dangerous temperatures to a median of 0 across tenure and income levels.
- Nearly 20% of low- and moderate-income renters lack access to heating or use propane for heating, the highest-cost fuel.

Equity Strategies

- Provide cooling access for households at greatest risk of dangerous heat exposure: low-income, multifamily building renters without cooling.
- Deploy cooling access and building envelope improvements in coordination for single-family homes without cooling.
- Shift to direct install for low- and moderate-income households. Include funding for renovations and electrical upgrades needed to add cooling.
- Prioritize heat pump installation in LMI households with no cooling or heating.
- Prioritize rent-controlled and affordable housing where upgrades will not increase rents.

Equitable Community Solar Access and Benefits

Improved Access to Solar and Storage for Multifamily Residents and Renters

Ashreeta Prasanna, NREL

Ashok Sekar, NREL

Jane Lockshin, NREL

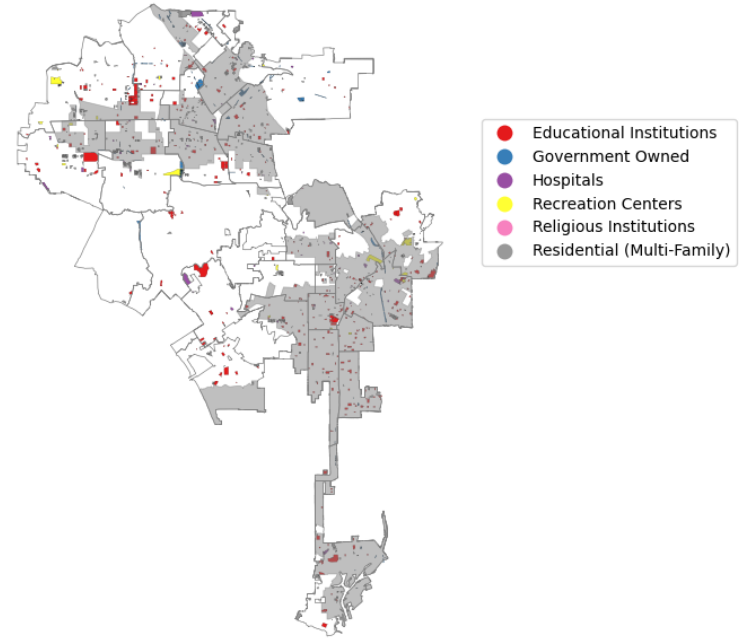
Paritosh Das, NREL



Community Solar Key Finding

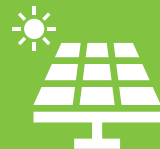
Establishing a 20% lower Shared Solar rate and increasing subscription caps to 500 kWh for low-income customers results in average savings of \$480 per year per household.

With IRA Investment Tax Credit bonuses, 364 multifamily properties could host economically viable, low-income-supporting community solar (30 kW or more).



Potential financially viable community solar sites on government-owned land, recreation centers, educational institutions, hospitals, and multifamily parcels. DAC communities are shown in grey.

Equitable Community Solar Access and Benefits Equity Strategies



Baseline Equity

- The LADWP Shared Solar Program enrollment rate is higher than the lower-use Tier 1 rate, but lower than the Tier 2 rate.
- The LADWP Shared Solar Program has higher participation and subscribed capacity among non-disadvantaged, non-Hispanic, and above-median-income communities.

Community Solutions Guidance

- Current community solar programs have insufficient incentives for low- and moderate-income customers to participate.
- Conduct more outreach in low- and moderate-income communities and communities of color on solar and storage options.
- Technical assistance on solar and storage is needed (for affordable housing organizations and others).
- Ensure ground-mounted solar development does not prevent affordable housing development.

Modeling & Analysis Key Findings

- Increasing the maximum subscription amount to 500 kW/month and lowering the subscription rate to \$0.18/kWh for low-income customers results in average savings of \$480 per year for low-income subscribers and \$68 per year for all other subscribers.
- IRA Investment Tax Credit bonuses make 378 potential multifamily community solar sites (30 kW or more) in low-income census tracts economically viable.
- 300 MW of 4-hour storage could be co-located with positive-NPV solar at 645 sites.
- Solar-plus-storage projects are not economically attractive (have a lower NPV) compared to standalone solar projects.

Equity Strategy

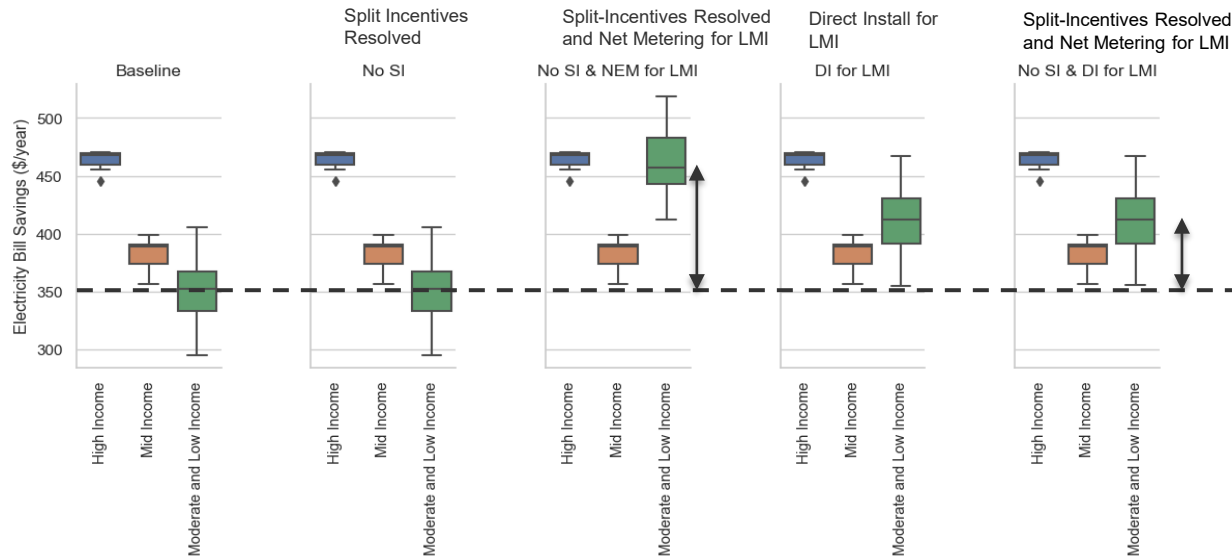
- Modify the Shared Solar Program to increase access and bill savings for low-income subscribers.
- Provide customers in multifamily buildings the opportunity to have virtual-net-energy metering (VNEM) from nearby commercial or other privately owned sites through an anchor tenant model.
- Provide compensation for community solar with storage that sets credits at the actual value of electricity at the time it is delivered.

Equitable Access to Solar and Storage Benefits

Key Finding

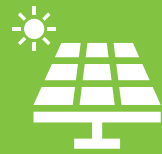
Offering net-metering to low- and moderate-income customers (simulated under the No SI & NEM for LMI scenario) results in an average savings of \$461 per year for these customers.

Under this scenario, moderate-, low-, and very low-income households see average savings of 30%, 30%, and 34%, respectively.



Equitable Access to Solar and Storage Benefits

Equity Strategies



Baseline Equity

- 62% of LADWP solar net energy metering program incentives went to households in non-disadvantaged communities.
- \$341 million in LADWP solar incentives disproportionately benefited predominantly White, non-Hispanic, home-owning, and wealthier neighborhoods.

Community Solutions Guidance

- Address the cost of rooftop solar.
- Provide community solar access.
- Deliver customized information on investments and payback periods to address skepticism about the value of solar.
- Protect residents from predatory solar developers.

Modeling & Analysis Key Findings

- LADWP has significantly high renter, multifamily, and low- and moderate-income households at 64% of all developable roof area.
- 1.45 GW of solar adoption is expected by 2035 with no co-location of batteries in the baseline model. Around 70% of that adoption is from single family owner non-LMI households
- Implementing LADWP direct install programs, combined with strategies to convey solar savings to renters, substantially increases solar capacity additions in DACs as compared to non-DACs as we approach 2035
- When the renter/owner split incentive is resolved and solar benefits also flow to renters, solar adoption is increased by ~84%.

Equity Strategy

- Solar program design that benefits low- and moderate-income customers enables these customers to achieve between up to 34% bill savings.
- Designing solar programs to enable renters to benefit from rooftop solar will increase adoption substantially.

Equitable Transportation Electrification – EVs, Charging, and Multimodal

Alana Wilson, NREL

Bingrong Sun, NREL

D-Y Lee, NREL






Transportation Electrification Key Finding

77% of LADWP residential EV incentives and rebates went to non-disadvantaged communities.

Low-income EV adoption could be substantially expanded through multifamily and renter access to home or near-home charging.

For the more than 11% of LA households that do not currently own a vehicle, targeted e-bike, e-scooter, and shared-EV programs can save costs and time, expanding access to and benefits from transportation electrification.

 Shared e-bike access
  Shared EV access
  Improved transit

Transportation Analysis Zone ID & Neighborhood	Most affordable	Most time efficient	Access to most opportunities	Transportation Analysis Zone ID & Neighborhood	Most affordable	Most time efficient	Access to most opportunities
3718 – Panorama City				4111 – Boyle Heights			
3731 – Panorama City				4114 – Boyle Heights			
3734 – North Hills				4115 – Boyle Heights			
3737 – Panorama City				4150 – Boyle Heights			
3864 – Reseda				4335 – East Hollywood			
3866 – Canoga Park				4611 – Wilmington			
3872 – Winnetka				4612 – Wilmington			
3877 – Van Nuys				4614 – San Pedro			
4067 – Boyle Heights				4630 – Wilmington			
4105 – Boyle Heights				<small>Calculated for low-vehicle ownership, low transit access, disadvantaged communities</small>			

Neighborhood-specific multimodal strategies for affordability, time efficiency, and access to destinations



Transportation Electrification Equity Strategies



Baseline Equity

- 77% of LADWP residential EV and EV charging infrastructure incentives went to households in non-disadvantaged communities
- The \$5.4 million in LADWP EV incentives disproportionately benefited predominantly White, non-Hispanic, home-owning, and wealthier neighborhoods
- Mostly non-Hispanic communities have more charging stations than mostly Hispanic communities
- In LA disadvantaged communities, 16% of households don't own vehicles vs. 12% citywide.

Community Solutions Guidance

- Support affordable and electric options to enhance mobility and reduce pollution
- Establish culturally informed, transparent, tailored, and consistent outreach and communication on programs
- Ensure charging stations are located to respond to daily household routines
- Set up low-income communities for charging personal EVs, shared EVs, e-bikes
- Expand e-bike, e-scooter, and EV-sharing programs in low-income communities.

Modeling & Analysis Key Findings

- Increasing the LADWP low-income used EV incentive from \$2,500 to \$4,000 and adding a purchase price cap of \$25k could result in 50,000 more used EVs adopted by low-income households by 2035
- By 2035, ~50% of potential LMI used EV consumers will be renters or live in multifamily buildings with limited charging access
- EV car sharing can provide affordable access to EVs, reduce transportation time, and increases access to opportunities in areas with very low car ownership rates
- The most affordable and most time-saving multimodal electric transportation strategies vary across communities.

Equity Strategies

- Establish a \$25k purchase price cap and increase the low-income used EV incentive to \$4,000
- Shift from delayed rebates to incentives at purchase point
- Provide at- or near-home charging for renters and multifamily building residents. Provide income-based public charging vouchers.
- Exempt low-income residential charging from peak pricing
- Add EVSE in DAC charging deserts
- Design community-guided EV car share, e-bike, and e-scooter programs that best serve the needs of the 19 transportation disadvantaged communities, including Boyle Heights, Wilmington, and Panorama City.

Equitable distribution grid upgrades for reliability and solar, storage, EV access

Equitable and resilient access to electricity-related services during extreme events

Bryan Palmintier, NREL

Sherin Ann Abraham, NREL

Kwami Sedzro, NREL

Jane Lockshin, NREL

Gayathri Krishnamoorthy, NREL

Kapil Duwadi, NREL



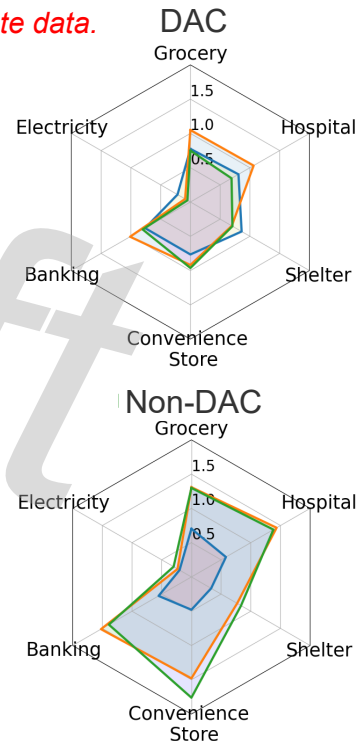
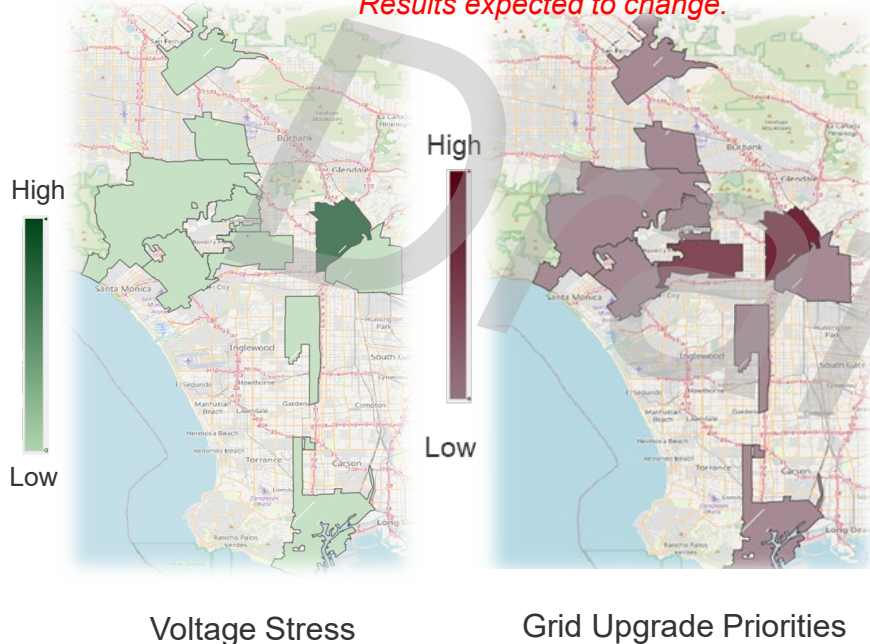
Distribution Grid Reliability & Resilience (Anticipated) Key Findings

Consequences of poor grid reliability do not equally impact all communities.

Although a wide range of grid upgrades are needed, requirements for customers to pay for service transformer upgrades may limit access to EVs, solar and storage, and electrification in homes, particularly in DACs.

Implementing strategies like undergrounding of electrical equipment, microgrids, battery energy storage improve resilience.

*Preliminary, indicative results for a small sample with incomplete data.
Results expected to change.*



Community Resilience Scores

Modeled 2035 Grid Stress under Equitable EV & PV Adoption Scenario (Preliminary Results)

Equitable Grid Upgrades



Baseline Equity

- Disadvantaged communities and mostly Hispanic communities experience more frequent power interruptions.
- Customer costs to upgrade utility transformers, when modernizing service size for electrification, integration of solar, storage, EVs, etc., can be a key barrier.
- Disadvantaged community census tracts less than half as likely to have underground distribution lines (12.6% vs. 26.7% of lines underground)

Community Solutions Guidance

- Update aging electric equipment to improve reliability in DAC neighborhoods.
- Support LMI households in upgrading electrical panels and service connections to access and use cooling, and efficient and renewable technologies.
- Expand outreach and awareness about resources and options in emergencies.
- Prioritize community members with energy-related health needs and seniors in emergencies.

Modeling & Analysis Key Findings (Anticipated)

- Inequities exist in the present distribution grid.
- Consequences of poor grid reliability do not equally impact all communities.
- Distribution grid limits access to new technologies inequitably.
- DACs can be as energy-service resilient as other parts of the city with targeted programs.
- Grid undergrounding, local generation and storage, microgrids, and community hubs in less resilient areas can increase survival probability.

Equity Strategies

- Incorporate equity while planning and prioritizing grid infrastructure investments.
- Upgrade service transformers for larger service when replacing aging equipment to avoid burden for EVs, solar, electrification, etc.
- Increase investments in undergrounding lines in DACs.
- Support energy storage and backup generation assets for households and critical service facilities in low-resilience-score neighborhoods
- Collaborate with CBOs on long outage preparedness in these neighborhoods.

Truck electrification for improved air quality and health outcomes

Garvin Heath, NREL

Vikram Ravi, NREL

Yun Li, NREL



Truck Electrification for Air Quality & Health

Key Finding

Heavy-duty trucks represent 5% of vehicles yet generate 51% of on-road nitrogen oxides (NOx) emissions.

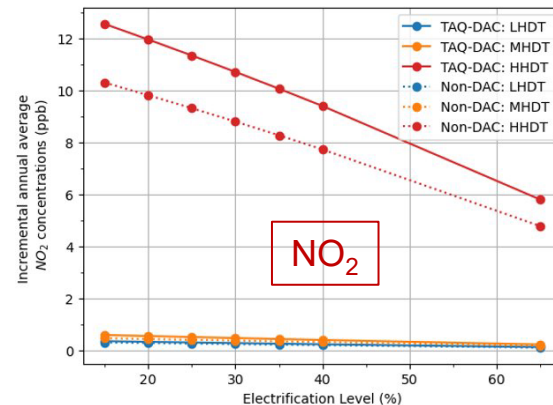
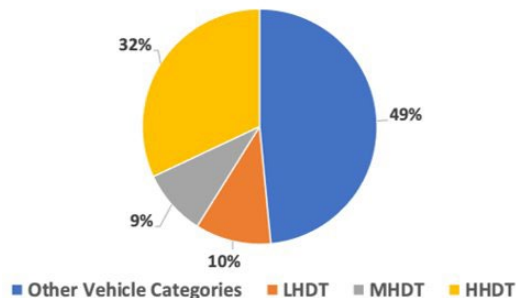
Heavy-heavy-duty trucks, like fire trucks and dump trucks, are 1% of vehicles and generate 32% of on-road NOx emissions.

Dangerous truck pollution is concentrated along freeways, impacting the health of near-road households.

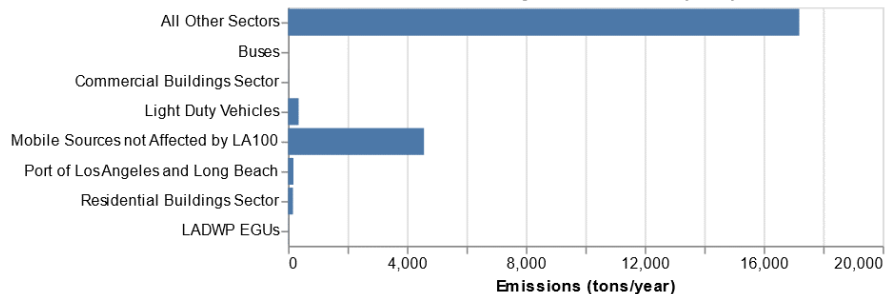
Electrification of heavy-heavy-duty trucks provides the most pollution reduction and benefits traffic-impacted disadvantaged communities the most.



Daily On-Road Motor Vehicle NOx emissions



LA100 Citywide Emissions (2045)



EGU = electricity generation unit

Truck Electrification Equity Strategies



Baseline Equity

- The \$63.7 million LADWP Commercial New Charger incentives were only available to light-duty vehicles and disproportionately distributed to non-disadvantaged, non-Hispanic, renter, and wealthier neighborhoods.
- 58% of DACs have percentile scores > 75 for either 'traffic impacts' or 'diesel PM' – two transportation related indicators in CalEnviroScreen.
 - 32% of DAC tracts have both of these indicators > 75th percentile.
- Trucks account for more than 50% of on-road transportation emissions and 27% of total NOx emissions in LA while having only 5% of vehicle population

Community Solutions Guidance

- Electrify trucks to reduce pollution and provide health benefits.
- Set up low-income communities for EV infrastructure.
- Focus on cleaning up pollution from the Port (e.g., freight traffic), LAX, South LA, and Pacoima.

Modeling & Analysis Key Findings

- Electrification of heavy heavy-duty trucks results in approximately 5x the NOx pollution reduction compared to light- and medium-trucks.
- The I-5, I-10, I-405 and US 101 freeways are “hot spots” for traffic air quality impacts in LA.
- Benefits to air quality and health increase at the same rate with each increment of additional electrification of vehicles, with benefits for DACs slightly greater than for non-DACs especially for heavy-heavy trucks

Equity Strategies

- Prioritize charging infrastructure incentives and EV purchasing incentives for heavy heavy-duty trucks, especially when replacing older model, higher emitting vehicles.
- Incentivize and locate charging infrastructure by working with city/regional agencies to understand where heavy-heavy duty trucks would ideally be charged.
- Revisit LADWP's Charge Up LA! Program goals of 4,000 MDHD-PEV by 2025 and 12,000 by 2030 and add associated MHDV charging infrastructure goals.
- Collaborate with city agencies to support city heavy-heavy duty truck fleet (e.g., fire trucks) electrification and charging infrastructure.

Discussion

UCLA's Approach & Contributions to LA100 Equity Strategies

Cassie Rauser, Ph.D.
Executive Director
UCLA Sustainable LA Grand Challenge



UCLA's Approach to LA100 Equity Strategies

- To participate as a customer and stakeholder, and offer our unique local experience
- To incorporate our broad range of local expertise and relationships to the project
 - drawing from engineering, environmental science, law, labor studies, public health and public policy
- To partner in the long term - Los Angeles is our home



UCLA's Contributions to LA100 Equity Strategies

- Energy Affordability & Policy Solutions
- Small Ethnic-Owned Business Study
- Air Quality & Public Health
- Jobs & Workforce Development
- Future Panel Upgrade Requirements



Energy Affordability and Policy Solutions Analysis

Greg Pierce, Rachel Sheinberg, et al.
UCLA Luskin Center for Innovation (LCI)
UCLA School of Law & Institute of the Environment and
Sustainability



Major Analysis Chapters

Legal and Regulatory Barriers Analysis (School of Law)

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

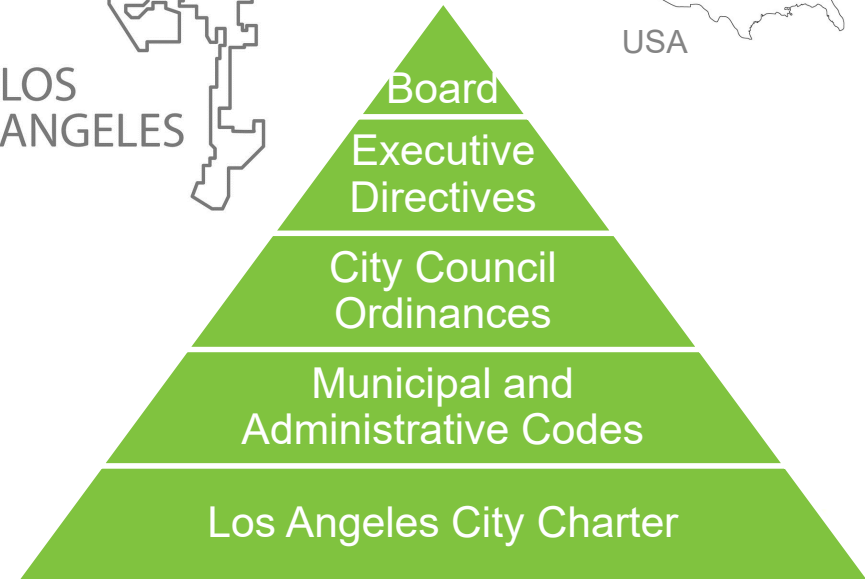
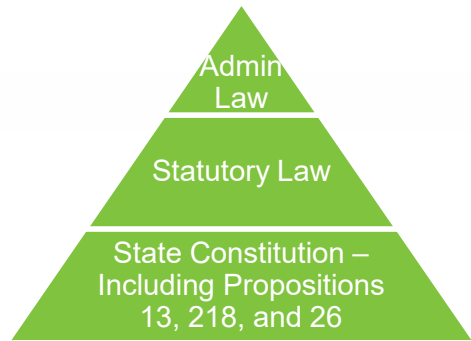
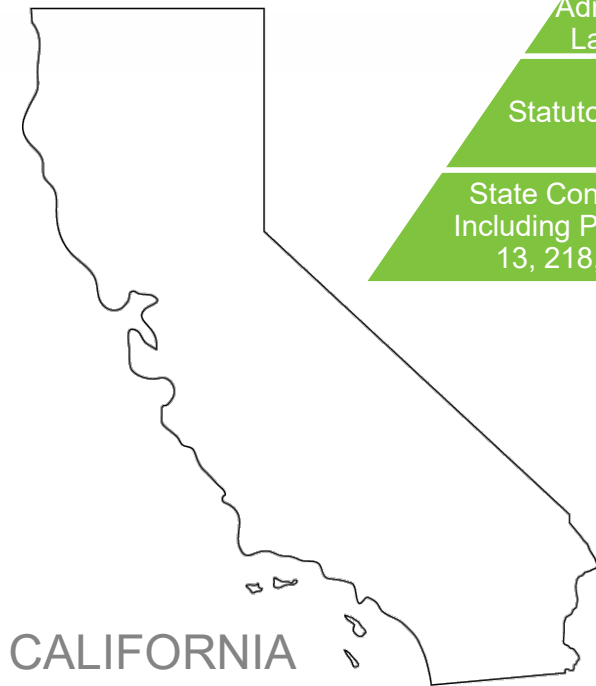


Research Process and Products

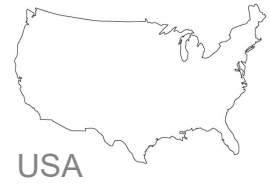
General Approach

- We are synthesizing data from a variety of existing sources, literature, and other documents
- We're not running a big survey or model
- Research Process relied on combination of:
 - LADWP administrative staff interviews
 - LADWP data shared through the Energy Atlas
 - Publicly available information and secondary documents
 - Analysis of metric adoption & policy performance in other service areas





Federal Energy Regulatory Commission (FERC) - Federal Power Act



Regulatory Levels



Regulatory Recap: Rate Changes Moving Forward

- The equity strategies work is being conducted **to support DWP and the community** in identifying the most impactful rate changes and affordability strategies for implementation
 - Most (if not all) of the studied strategies would require a successful city-wide ballot initiative in order to be implemented
 - State and federal funding from programs like the **Inflation Reduction Act** could also support affordability programs *without* being subject to Propositions 26 and 218, and LADWP is already in the process of applying for this type of funding
 - Expanding enrollment may be the most effective short-term strategy to support low-income residents without constraints



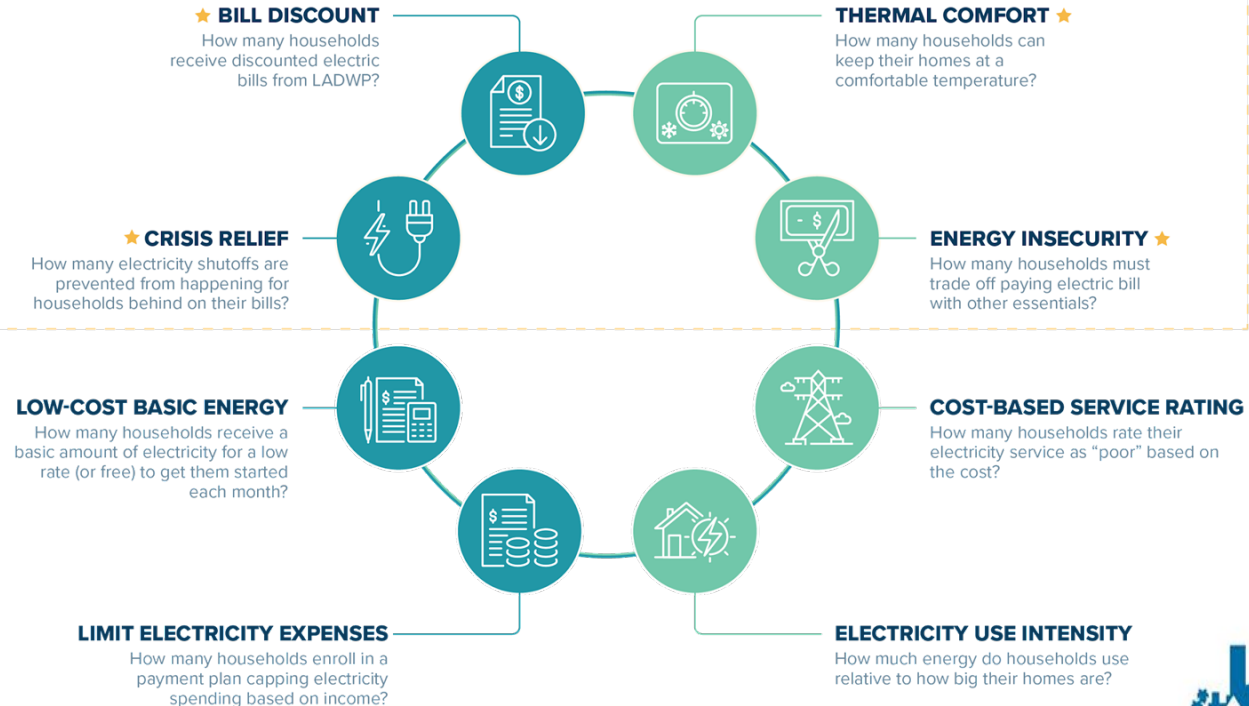
Metrics options analyzed

ENERGY AFFORDABILITY METRICS

POLICY-SPECIFIC METRIC TYPES

GENERAL METRIC TYPES

★ METRICS ANALYZED IN THIS PROJECT ★



Metrics recommendations

METRICS



DISCOUNT PROGRAMS

- 80% or higher enrollment



CRISIS RELIEF

- <1% uncovered residential shutoffs
- Aggressive numerical target for uncovered small business shutoffs



THERMAL COMFORT

- <5% self-reported discomfort
- <5% thermostat > 78 degrees



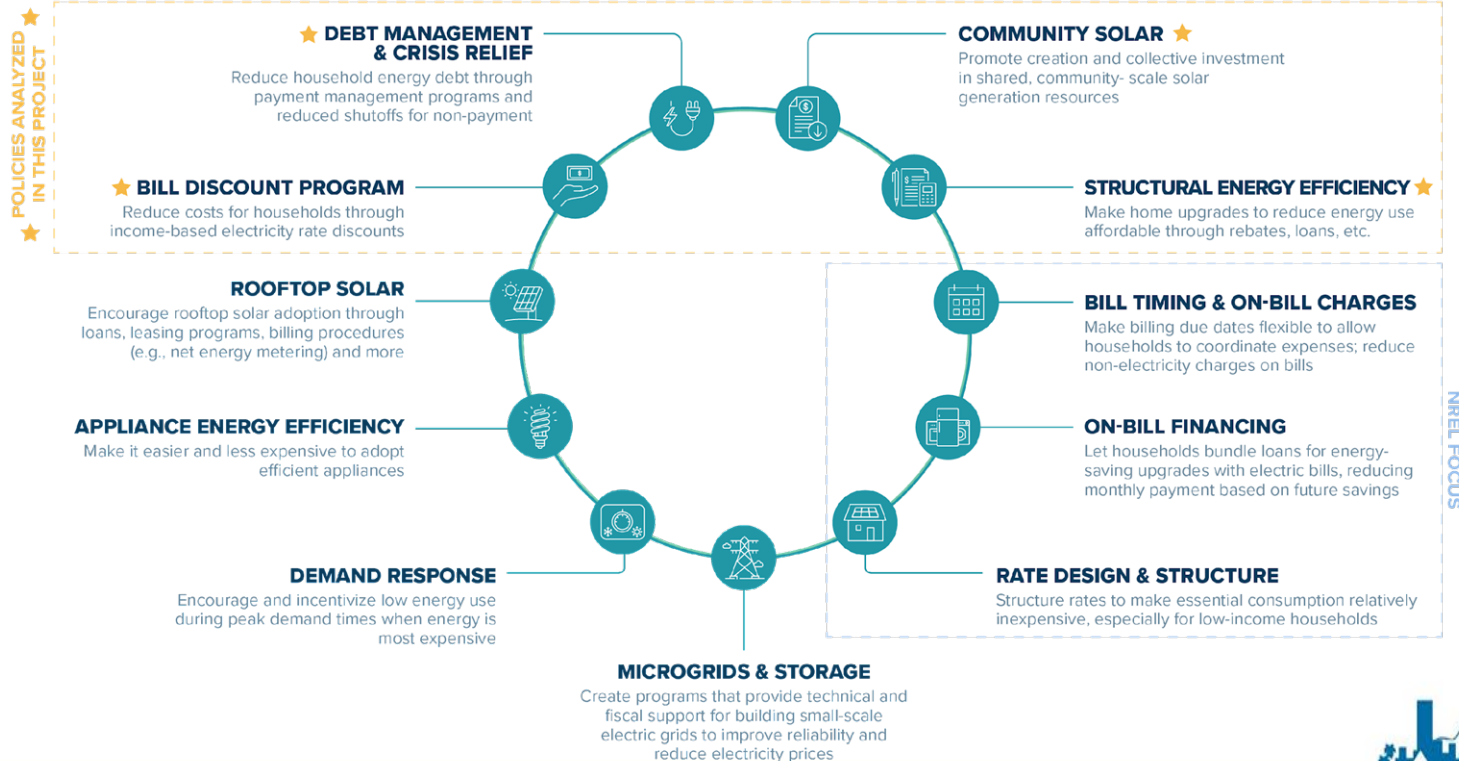
ENERGY INSECURITY

- No current recommendation



Policy options analyzed

AFFORDABILITY POLICY OPTIONS



Policy Recommendations

POLICIES



DISCOUNT PROGRAMS

- Enhance enrollment in two major programs
- Next: expand benefits & eligibility pool closer to CARE/FERA



CRISIS RELIEF

- Boost discount enrollment and evaluate motion impact
- Next: protections for other residential & small biz customers



STRUCTURAL EFFICIENCY

- Support city-wide efforts to route IRA & LIHEAP+ funds
- Rapidly scale & adapt “in field” impacts of CAMR



COMMUNITY SOLAR

- Evaluate “in field” VNEM pilot for potential expansion



Ethnic Business Study

Ariana Hernandez, Project Manager

Paul Ong (PI) and Silvia Gonzalez (Co-PI)

Leslie Velasquez and Ruth Rodriguez, Research Assistants

UCLA Center for Neighborhood Knowledge

UCLA Latino Policy and Politics Institute



Survey Goals and Objectives



Goals: Gain insights on the energy affordability barriers and opportunities for small ethnic-owned businesses (EOBs).

Objectives: Survey 500+ EOBs.

Topics: (1) Firm characteristics; (2) COVID impacts and relief programs; (3) Energy burden; (4) Climate-change impacts; (5) Sustainability practices; and (6) Programmatic needs.

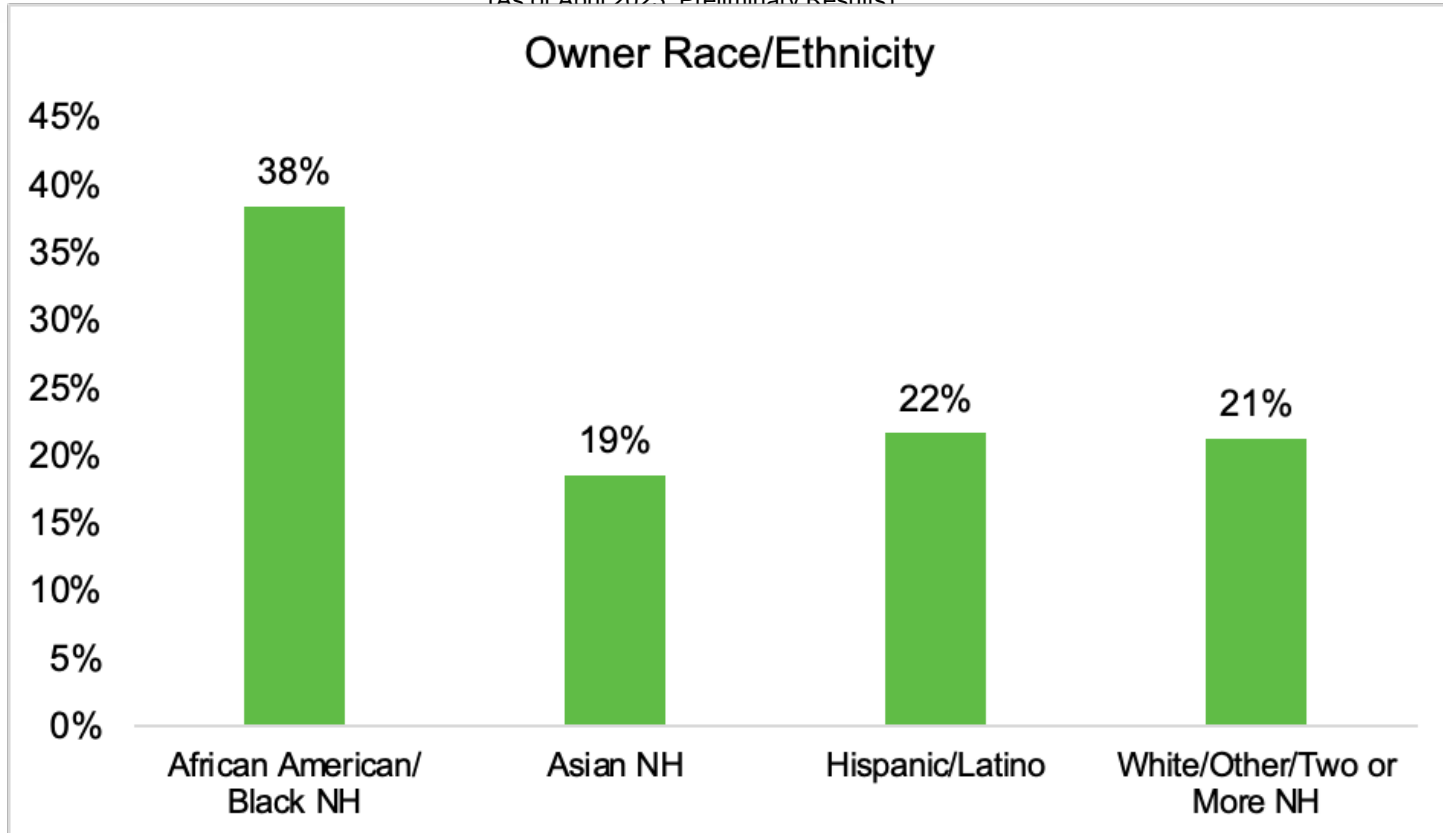
Strategic Approach: Partner with LADWP, ethnic community based organizations, and ethnic business groups.



Survey Respondent Characteristics

Major Observations

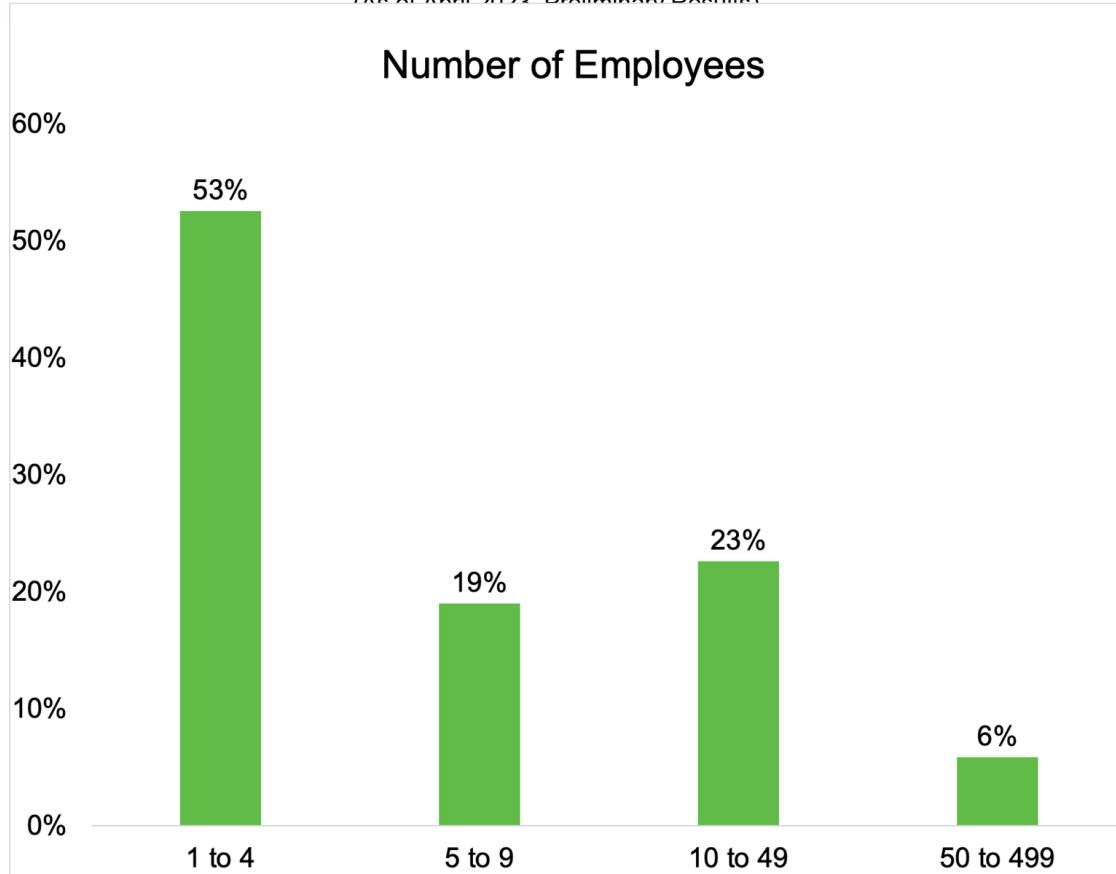
(As of April 2023 - Preliminary Results)



Survey Respondent Characteristics

Major Observations

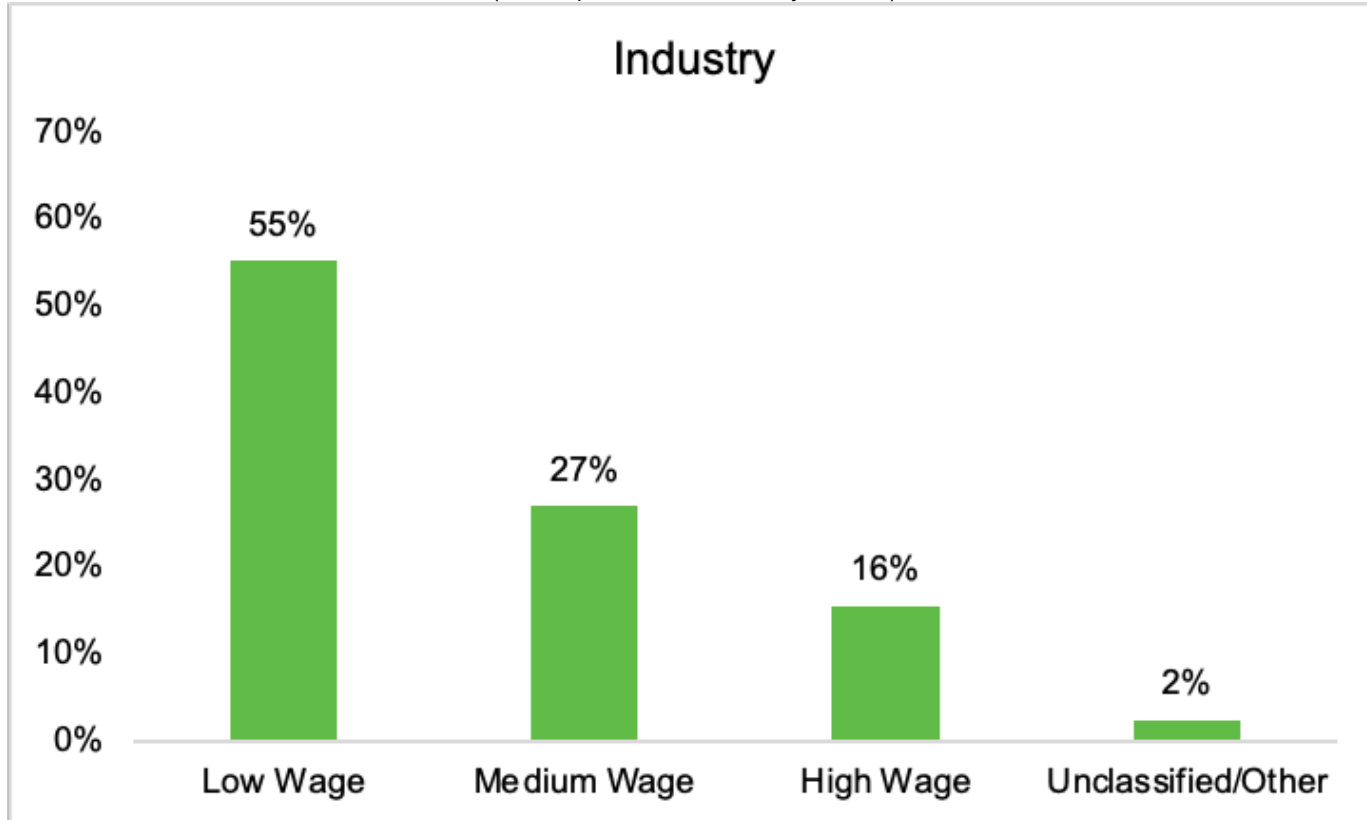
(As of April 2023 - Preliminary Results)



Survey Respondent Characteristics

Major Observations

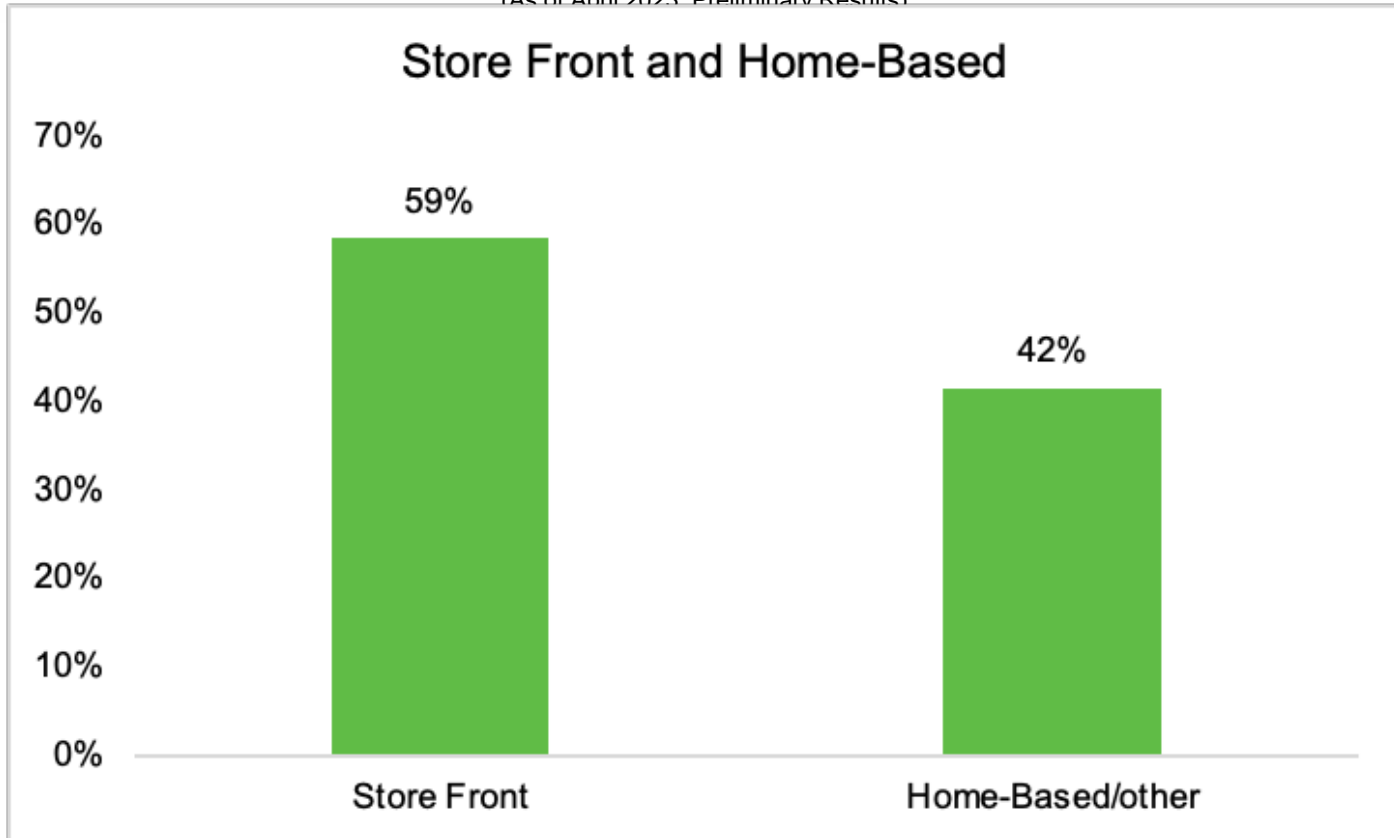
(As of April 2023, Preliminary Results)



Survey Respondent Characteristics

Major Observations

(As of April 2023 - Preliminary Results)



Major Survey Takeaways

(As of April 2023, **Preliminary Results**)

1. **Nearly 3 out of 4** of small ethnic-owned businesses (EOBS) experienced negative COVID impacts and faced numerous barriers to accessing government programs and assistance.
2. **Almost 1 in 3** of small EOBs are energy burdened and struggle to pay their utility bills.
3. **Over 50%** of EOBs have already been hurt by climate change, and **nearly 50%** expect negative impacts for their future.
4. **Only 1 in 10** of EOBs businesses in the City of Los Angeles are aware of and understand the consequences of LADWP's transition to 100% renewable energy.
5. **Less than 25%** of EOBs have a sustainability plan in place.
6. The priority needs for small EOBs to transition to 100% renewable energy



Workshop and Qualitative Input

(As of April 2023, **Preliminary Results**)

1. LADWP does not currently have a strategy to analyze business data to better understand their small business customers in terms of energy consumption and program participation.*
2. Direct outreach to small ethnic-owned businesses, small ethnic business serving organizations, and in-language accessibility is necessary to reach entrepreneurs who are typically excluded from traditional business studies.
3. Outreach events should include opportunities for two-way interaction -- LADWP providing critical information on small-business programs to EOBs, and EOBs providing recommendations to LADWP on EOB priorities and needs.

*LADWP does not have a current strategy that we are aware of.



Recommendations for LADWP

(As of April 2023, **Subject to Change**)

1. **Evaluate recent and current small-business energy efficiency programs** to identify which effectively engage small EOBs to successfully reduce energy consumption and costs.
2. **Develop more targeted policies, programs, and practices** to assist small businesses and eliminate the participation barriers that EOBs face.
3. **Partner with business-serving community-based organizations and other trusted agencies** to provide technical assistance and better engage their small business customers, particularly EOBs.
4. **Examine whether its community engagement efforts** are equitably reaching disadvantaged communities where small businesses have high energy burdens, and use the results to correct any systematic disparities in outreach.
5. **Examine the legal mechanisms that would enable them to provide monetary assistance to small businesses and EOBs** to reduce barriers to access substantive energy efficiency equipment upgrades, which are typically cost-prohibitive.



Air Quality & Public Health

Yifang Zhu, Ph.D.

Professor of Environmental Health Sciences

UCLA Fielding School of Public Health

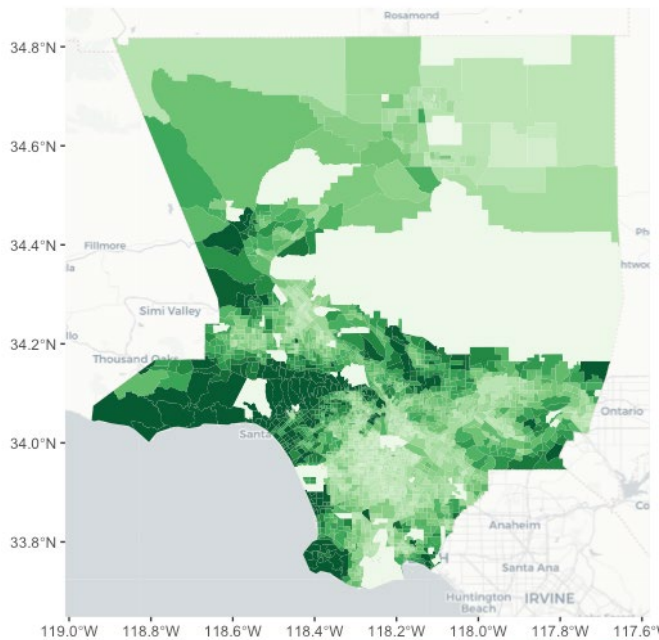


Project Overview

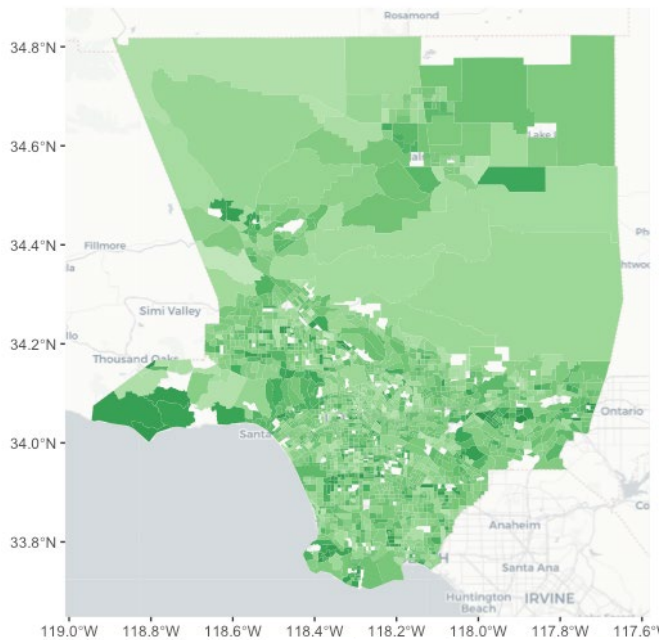
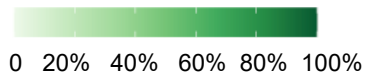
- Investigate the potential **environmental** and **public health** benefits of zero-emission vehicles (ZEVs) especially among disadvantaged communities (DAC)
 - Simulate ZEV travels using agent-based travel demand model
 - Project PM_{2.5} and O₃ concentrations using 1 km x 1 km WRF-Chem model
 - Assess health benefits using ethnic and racial-specific exposure-response functions
- In addition to the 2017 **Base** scenario, three scenarios are modeled
 - 2035 **Disparity**: ZEV adoptions are **not** equally distributed in the city of LA
 - 2035 **Equity**: ZEV adoptions are equally distributed in the city of LA
 - 2035 Mobile Source Strategy (**MSS**): more emission reduction in trucks and off-road equipment



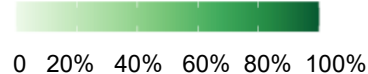
ZEV Ownership vs. electric Vehicle Miles Traveled (eVMT)% in 2035



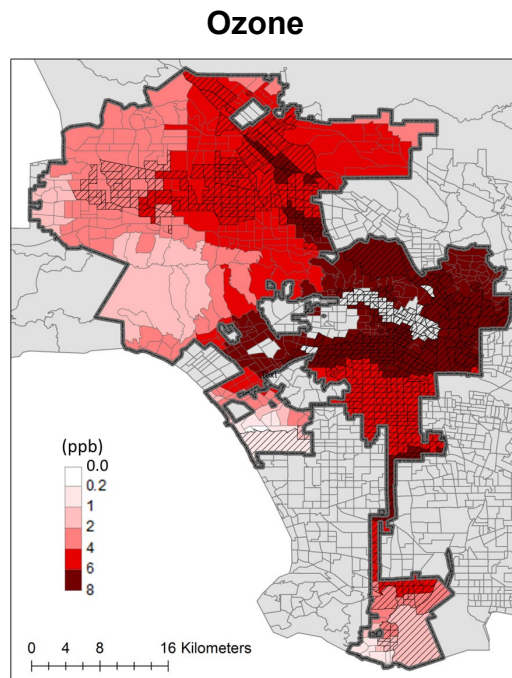
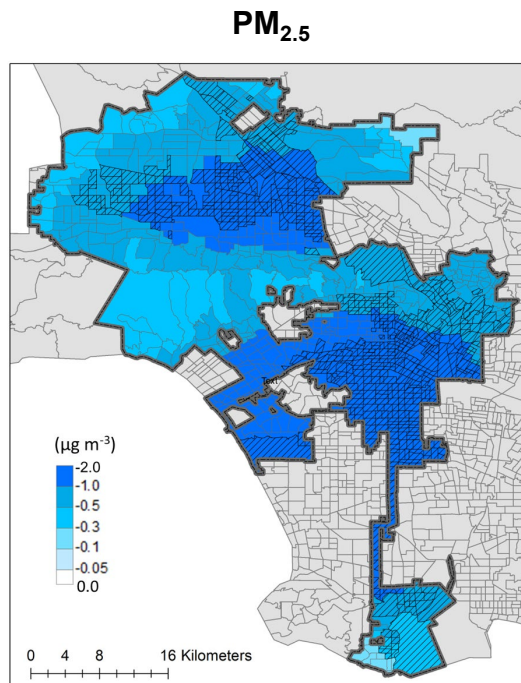
ZEV Ownership in 2035



eVMT % in 2035



Results: Pollutant Changes from 2017 to 2035



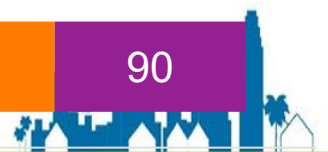
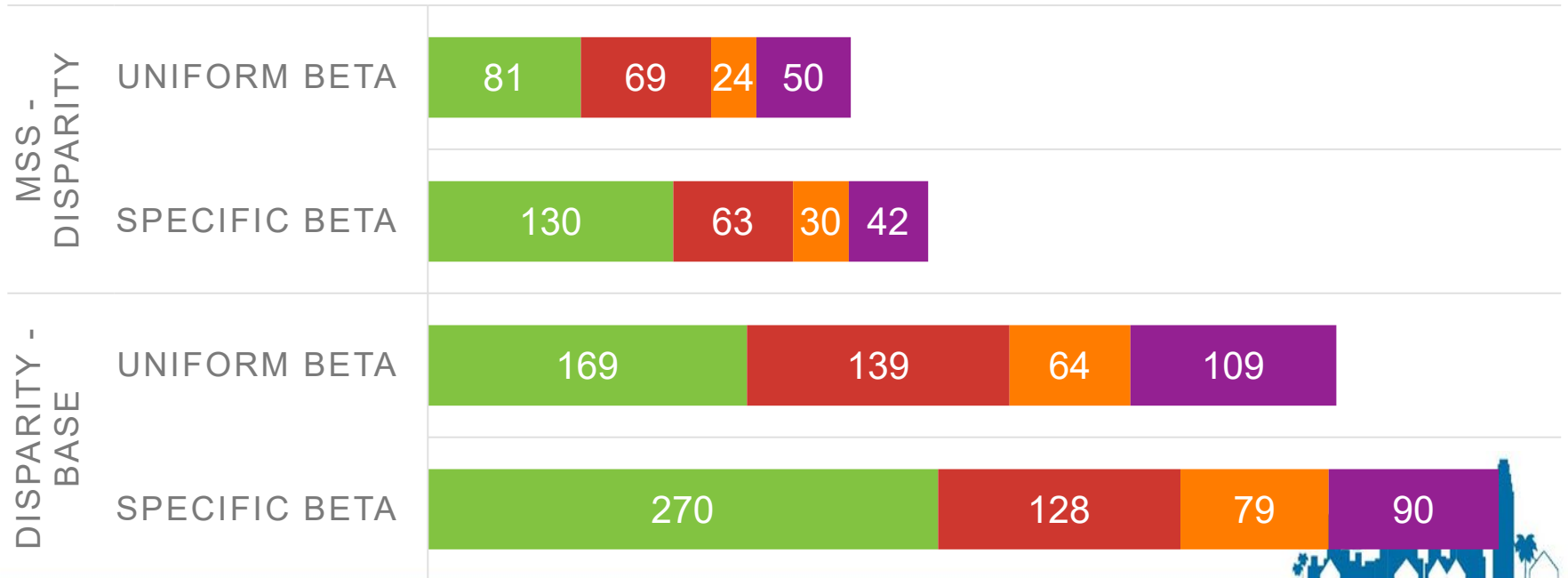
- PM_{2.5} reduces from 11.5 to 10.6 $\mu\text{g}/\text{m}^3$ (-7.4%)
- Ozone increases from 38 to 42 ppb (+12.0%) due to NO_x reduction



Results: Health Benefits Might be Underestimated

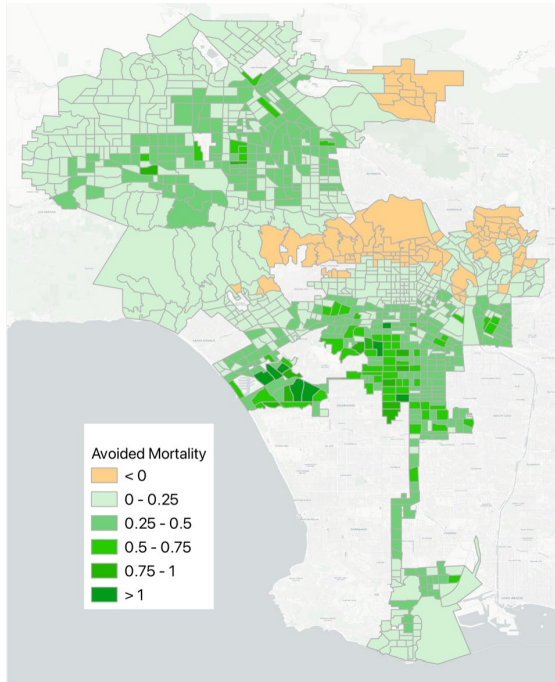
PM_{2.5} AVOIDED MORTALITY BY RACIAL/ETHNIC GROUPS

■ Hispanic ■ White ■ African American ■ Other

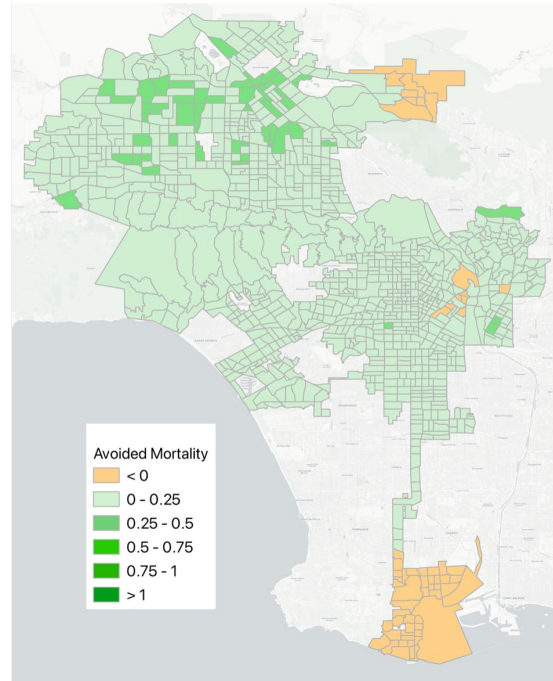


Results: Total Avoided Deaths (PM_{2.5} + O₃)

Disparity - Base



MSS - Disparity



- A total of 330 deaths were avoided
- Ozone increase is the main driver for areas with negative values



Summary: Air Quality and Public Health

- Vehicle electrification reduces $PM_{2.5}$ that can lead to **improved health** outcomes for both disadvantaged and non-disadvantaged communities
- Electrifying **medium- and heavy-duty** trucks will bring more health benefits than light-duty vehicles
- The use of ethnic and racial-specific exposure-response functions can help reveal **greater health benefits**, particularly for the Hispanic population, than previously estimated
- To reduce ozone, it is crucial to **further reduce NOx** and reduce **volatile organic compounds** in parallel with $PM_{2.5}$ and NOx reduction



Green Jobs & Workforce Development

Dr. Raúl Hinojosa-Ojeda and Dr. Abel Valenzuela
UCLA



Final Report Overview

- Green Jobs Calculator
- LADWP Jobs and Regional Equity
- LADWP Green Jobs Projections
- Green Jobs Workforce Development Pilot Project
- Wilmington Case Study
- Community Engagement Report



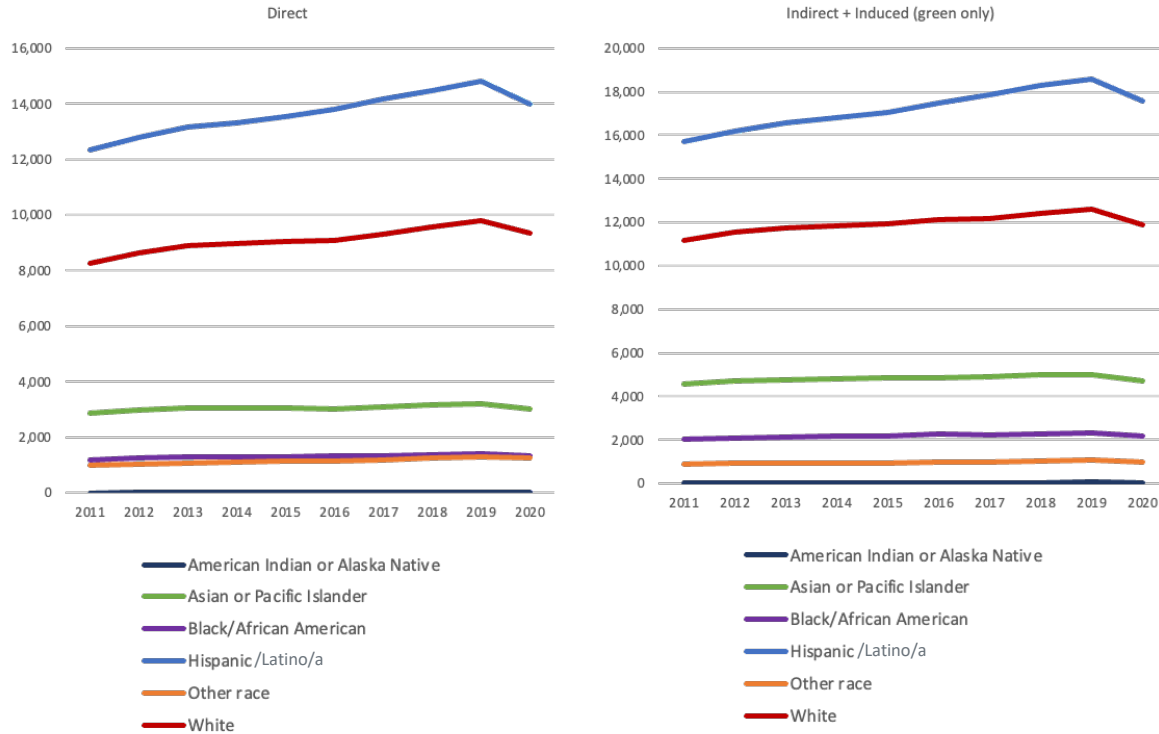
Green Jobs Calculator

- 1 Green Job Historical Trends
- 2 Calculating Direct, Indirect and Induced Green Jobs
- 3 Regional/Racial Equity and Interdependence
- 4 LA100 Scenarios Workforce Needs
- 5 Current and Future Scenarios for Equitable Employment Composition
- 6 Required Workforce Development Investments



The Growth of Hispanic Green Jobs is very complementary and beneficial to White and Black Green and non-Green workers

Figure 2: LA City Green Direct, Indirect and Induced Total Green Jobs by Ethnicity, Number of Jobs



Latinx workers are the largest group with Direct Green Jobs, yet the indirect + induced Green Jobs growth effects for all other races is higher than for Latinx workers.



LADWP Green Jobs Data and Equity Analysis

Income



Occupation



Race/Ethnicity/Gender



Geo-Residency DAC/non-DAC



Investment Employment Impact



LADWP Employee Data Analysis Findings

1. Hispanic, White, Asian and Black workers make up the largest shares of employees in the DWP Power sector
 - a. Hispanic workers are most represented in Construction, followed by White and Black workers
 - b. Energy Generation has White workers as the largest group, followed closely by Hispanic workers, and then Black workers
2. Most DWP Workers, who are relatively well paid, do not live in Disadvantaged Communities (DACs)
3. However, Hispanic and Black workers make up the largest share of DWP employees living in DACs and earn the lowest wages of DWP workers living in both DACs and Non-DACs
4. Hispanic and Black workers are more concentrated in lower wages occupations and activities yet earn comparable wages in higher and lower paid occupations

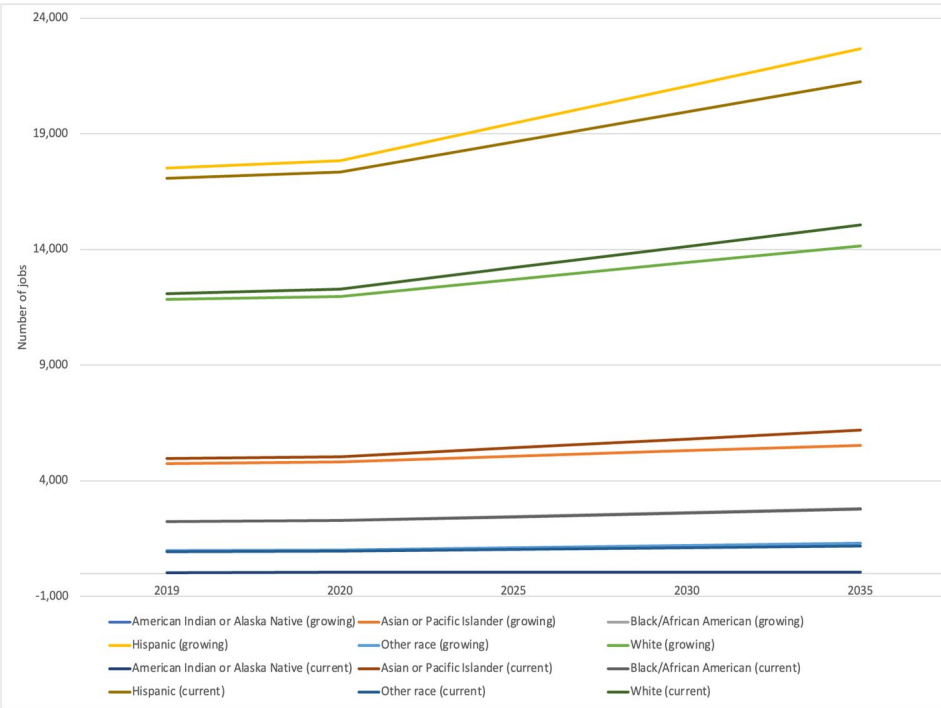


Gap Analysis of Projected Green Jobs in LA City (Current Inequality vs Growing Demography)

Direct

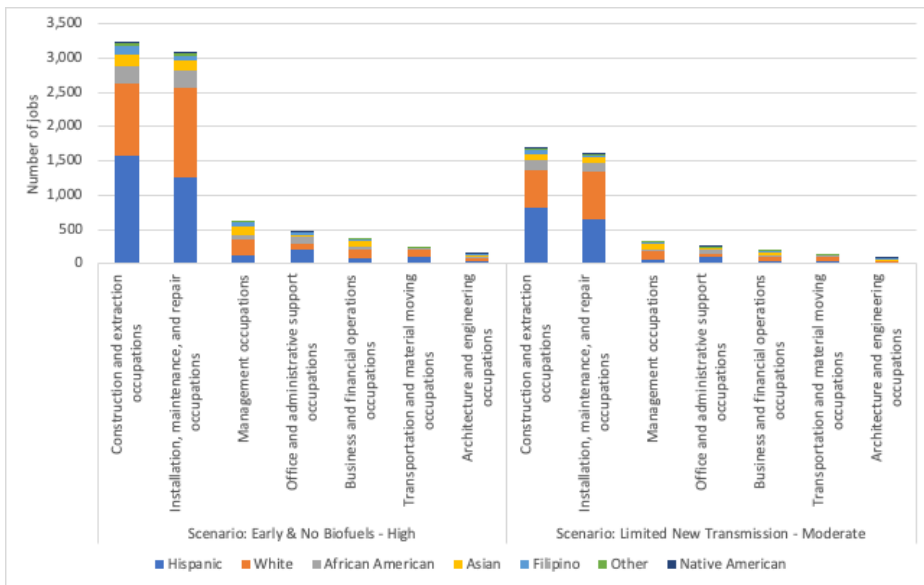


Indirect + Induced



Workforce Development Projections, Based on LA100 Projections

Installation and Construction, In-Basin



Occupation	Early & No Biofuels-High	SB100-Moderate
Architecture and engineering occupations	153	80
Arts, design, entertainment, sports, and media occupations	3	2
Building and grounds cleaning and maintenance occupations	17	9
Business and financial operations occupations	364	190
Computer and mathematical occupations	42	22
Construction and extraction occupations	3,238	1,688
Installation, maintenance, and repair occupations	3,082	1,607
Legal occupations	10	5
Life, physical, and social science occupations	42	22
Management occupations	614	320
Office and administrative support occupations	471	246
Production occupations	66	34
Protective service occupations	17	9
Sales and related occupations	38	20
Transportation and material moving occupations	239	125
Total	8,397	4,378



Wilmington Case Study

Community Engagement, Green Jobs & Workforce Development

Wilmington Case Study Methodology

- Historical Construction of Inequality
 - Complementary Check to Equity Impact Modeling and Estimating Workforce Investment
 - Community resident and organization engagement of data evidence usage for future strategic investments for Workforce Training and Equitable Development
 - Foundations for Equitable Workforce Trainings
 - Principles of the High Road Workforce System
1. Wilmington Demographics
 2. Wilmington & Industries Background
 3. Wilmington Residents' Health Risk Background
 4. State Policy Impacting Wilmington and Challenges
 5. Wilmington Residents' Low Political Participation
 6. Community Engagement in Wilmington
 7. Green Jobs Workforce Development Pilot Project
 8. Recommendations



DWP Workers Residence by Zip Code Los Angeles County

INICIO

ZipCode

Search

Select all

90001

90002

90003

Disadvantaged

Search

Select all

Disadvantaged

No Disadvantaged

Out County

Occupation

Search

Select all

Architecture and Eng...

Building and Ground...

Construction and E...

Installation, Mainte...

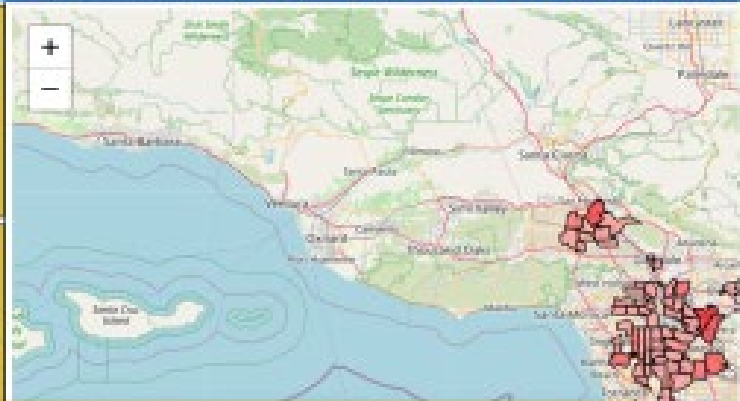
Life, Physical, and S...

Management

Office and Administr...

Production

Transportation and ...



CALIFORNIA, LOS ANGELES COUNTY, 90744

General Indicators		Population by Race		Families with income below poverty level	
Total Population	11,400	45,888	3,787	3,779	
Male Population	58,058	1,880	4,031	3,696	
Female Population	55,882				
Pop under 18 years	16,737				
Pop 18 to 24 years	16,927				
Pop 25 to 44 years	16,855				
Pop 45 and over	16,648				
Foreign Born	21,858				
Mexican Foreign Born	18,833				
Salvadoran Foreign Born	1,046				
Ethnic Index		Households by Income		LADWP Workers	
329	37	478	14		
1 (0.000%)	1 (0.000%)	1 (0.000%)	LADWP Male		
33	1	14	1		
0 (0.000%)	0 (0.000%)	0 (0.000%)	LADWP Female		
Hispanic Migrants		Salvadoran Migrants			
18,422		409			

DWP Data on Wilmington

DAC Census Tracts in Zip Code	88%
LADWP Power Workers Residing in Wilmington	0.26%
LADWP Power Workers Reporting in Wilmington	2.4%
Green Jobs in Wilmington	807
Direct Green Jobs	329
Indirect + Induced Green Jobs	478

Legacy pollution

At or above at least one threshold?	Yes
Proximity to hazardous waste facilities Count of hazardous waste facilities within 5 kilometers	95th ↑ above 90th percentile
Proximity to National Priorities List (NPL) sites Proposed or listed NPL (Superfund) sites within 5 kilometers	73th ↓ below 90th percentile
Proximity to Risk Management Plan (RMP) facilities RMP facilities within 5 kilometers	95th ↑ above 90th percentile
AND	
At or above both associated thresholds?	Yes
Low income Household income is less than or equal to twice the federal poverty level	91th ↑ above 90th percentile
Higher education non-enrollment Percent of the census tract's population 15 or older not enrolled in college, university, or graduate school	91th ↑ above 90th percentile

Wilmington Residents Community Engagement

- Community Engagement meetings began November 2023, monthly meetings for six months
- Measure before and after level of knowledge on LADWP and Green Jobs
- Surveyed participants to compare Wilmington's representation of demographics based on DACs indicators
- Preliminary findings in early stage, our last meeting took place yesterday April 25th
- “Bottom-up” Planning led to \$4million Community Center for Technology and Workforce Development



Summary, Questions and Answers

Report Summary LADWP Green Jobs

- Public Access Data Platform for Stakeholder/Community Planning for Future Workforce Development Scenarios
- Build on green jobs workforce development pilot in DACs for an equitable distribution of labor and further explore income, race and gender gaps
- Utilize community engagement recommendations for Multiple DACs “bottom up approach” to build a more equitable Green Jobs Workforce Development Infrastructure



Future Panel Upgrade Requirements for Residential Electrification

Stephanie Pincetl and Eric D. Fournier

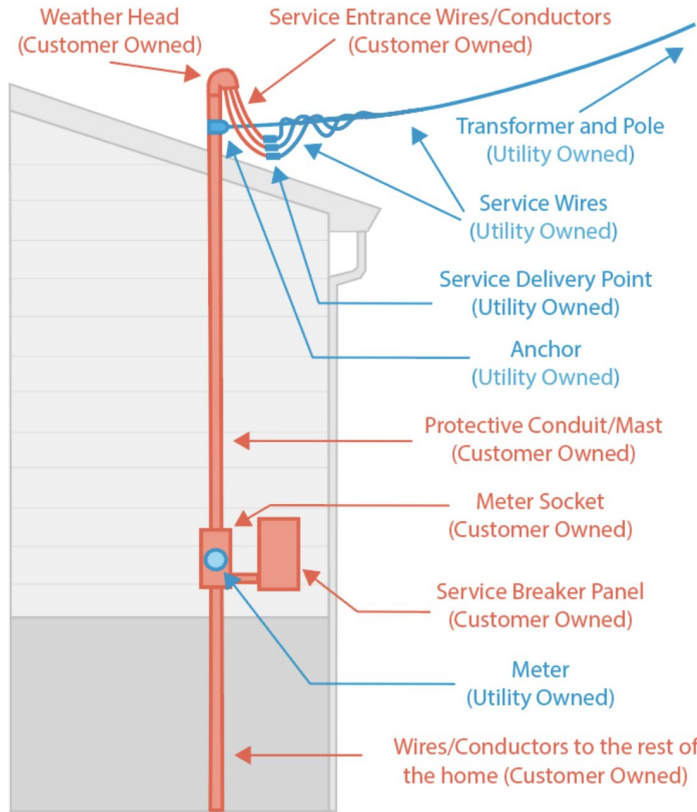
UCLA California Center for Sustainable Cities



Electric Service Panels

(a.k.a. "Load Centers")

These are pieces of customer owned hardware that physically interconnect to utility owned distribution system infrastructure.



The rate at which electricity that can be consumed within a structure (i.e., its service capacity) is determined by both the capacity of the utility owned distribution system hardware and the customer owned load center hardware which serve it.

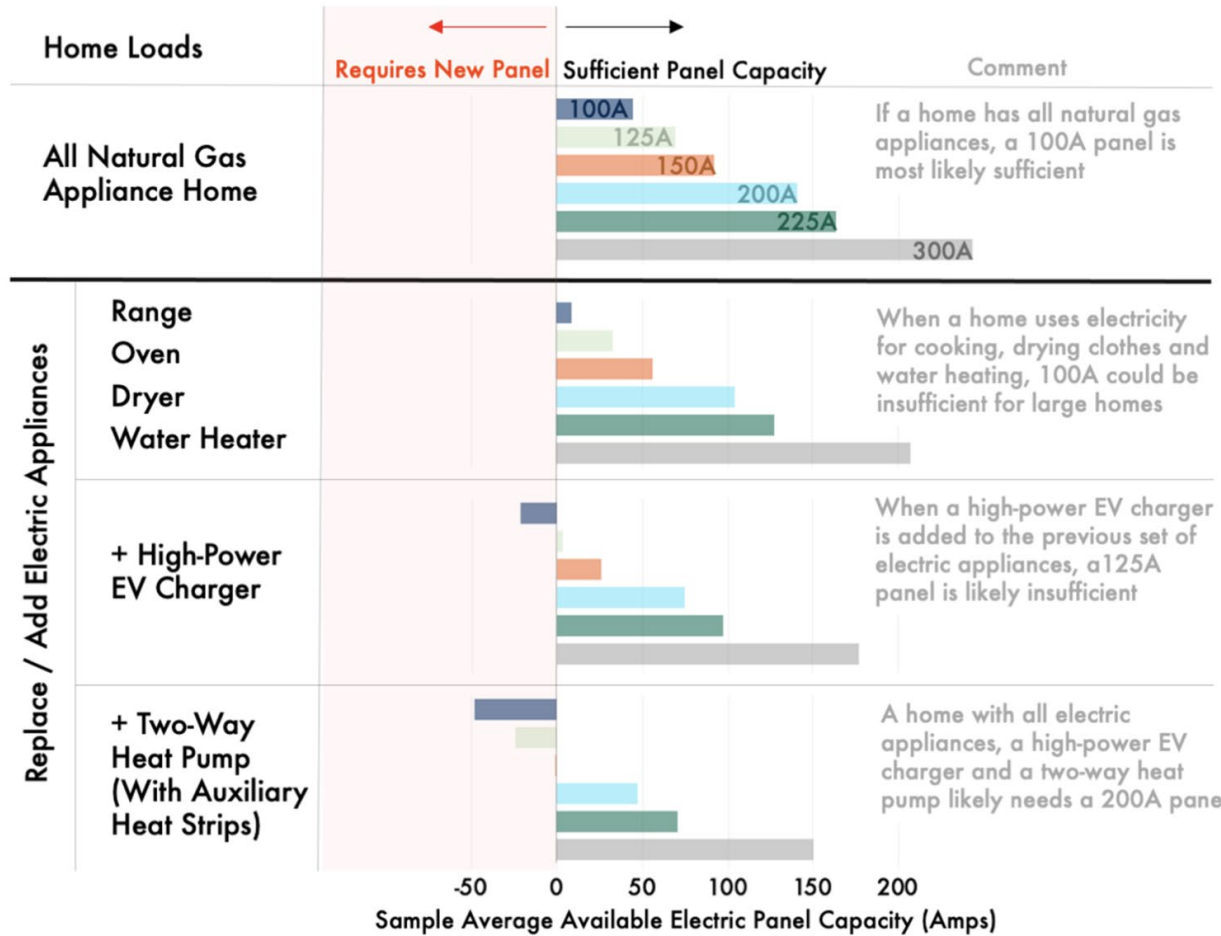


Single Family Property Service Panel



Multi-Family Property Load Center





How Much Capacity is Needed?

The need for a panel upgrade to support electrification depends upon the capacity of the existing hardware relative to the needs of new equipment.

The figure here, from a recent Pecan Street report summarizes the likely panel capacity ratings that would be necessary to support the addition of new electric appliances within a “typical” home.



Methodology Overview

Estimate As-Built Service Capacity

1

Identify Historical Permitted Upgrades

2

Infer Antecedent & Unpermitted Upgrades

3

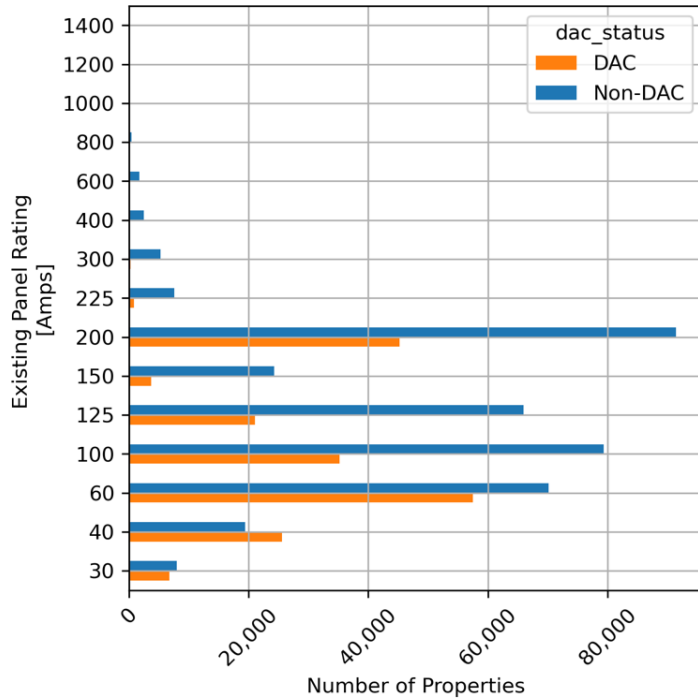
Assign Existing Service Capacity

4

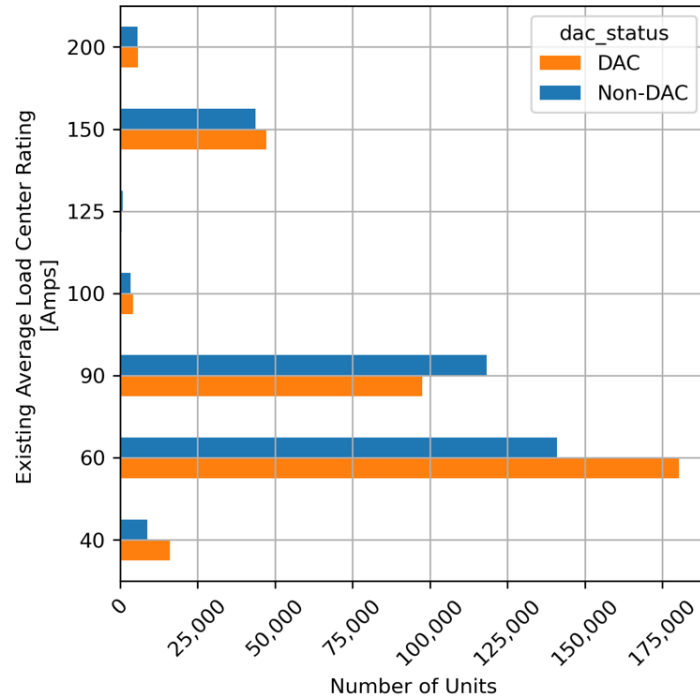


Estimated Existing Panel Ratings

Single-Family Properties



Multi-Family Units



Single-Family Properties

Panel Rating Classification	Upgrade Required for Future Full Electrification?	DAC Properties [Percentage]	Non-DAC Properties [Percentage]
<100 Amps	Likely	45.78%	25.91%
>=100 Amps & <200 Amps	Potentially	30.57%	45.10%
>= 200 Amps	Unlikely	23.65%	28.99%

Multi-Family Properties

Panel Rating Classification	Upgrade Required for Future Full Electrification?	DAC Properties [Percentage]	Non-DAC Properties [Percentage]
<90 Amps	Likely	66.85%	56.30%
>= 90 Amps & <150 Amps	Potentially	19.21%	30.04%
>= 150 Amps	Unlikely	13.94%	13.66%



Results Overview

- The load center capacities that can guarantee support of full electrification are ≥ 200 Amps for single-family homes and ≥ 150 Amps for multi-family units.
- It is possible to partially electrify dwellings with smaller panel sizes, however, it will likely require more intelligent hardware, load splitting, and/or lower voltage appliances.
- 45% of the single-family homes within DACs are likely to need panel upgrades in order to fully electrify. This ratio drops to 25% in non-DACs.
- However, the larger number of single-family homes within non-DACs however means that, overall, the city's non-DACs contain a greater overall share of the total number of homes that will need to be upgraded.
- 66% of multi-family properties in the city within DACs and 56% within non-DACs, are likely going to require load center upgrades to fully-electrify all end-use equipment.
- Upgrading the load centers of these multi-family buildings will be a more challenging and expensive than it will be for single-family properties.
- Increasing the rate at which these properties are upgraded should be considered and equity strategy priority.



UCLA Concluding Thoughts

Greg Pierce and Stephanie Pincetti



UCLA-NREL-DWP partnership has established the foundation for:

- A continued iterative process of co-learning going forward.
- The development of strategies for engagement and implementation of LA100 ES reports and analysis with community and LADWP.

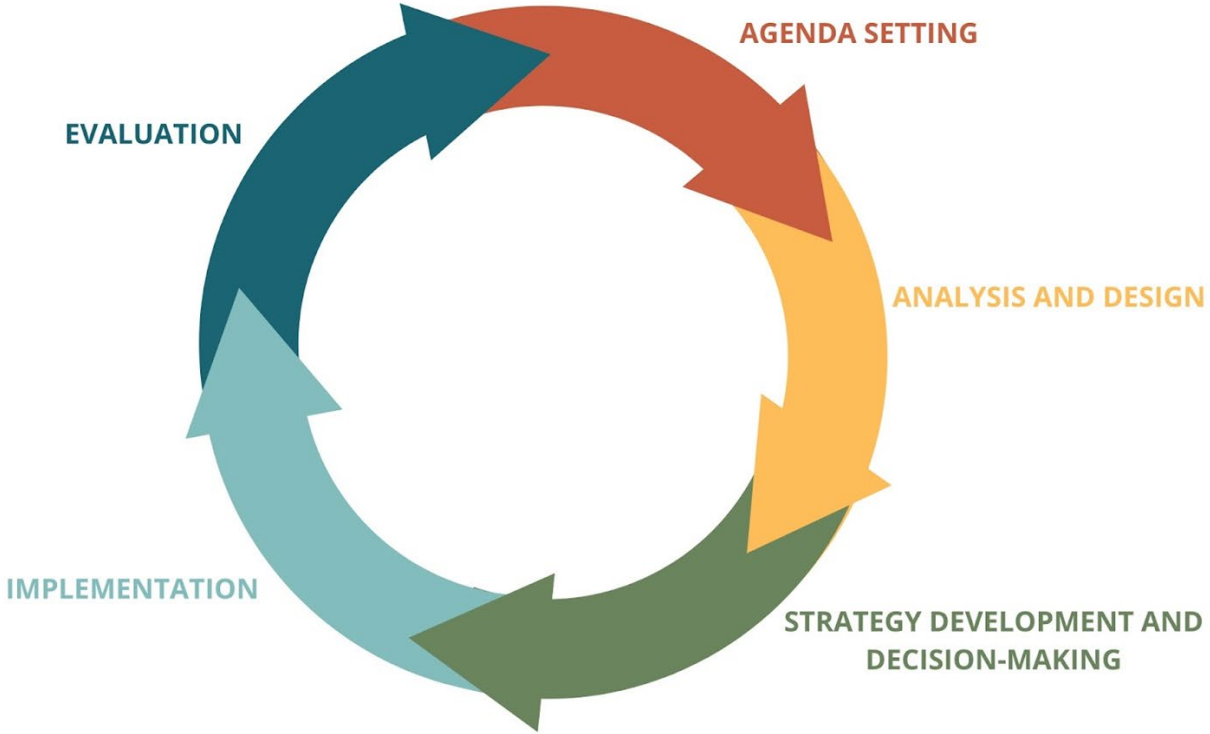


UCLA-NREL-DWP partnership has established the foundation for:

- Translating LA100 Equity Strategies into specific metrics and accountability framework for DWP's EMDI, from jobs to energy burden.
- Continued work on specific topics
 - E.g., shut-offs/debt/rates and leveraging of mapping tools for the transition.



Potential Next Steps: An Evidence-Based Decision-Making Process for LA100 ES Implementation



Combining Evidence-Based Decision-Making and Community Engagement

UCLA brings decades of inquiry, observations, and expertise across a broad landscape of relevant subject matter to support:

- the design and objectives of *participatory engagement activities
- the development and vetting of supporting content
- the analysis of emergent challenges
- the integration of knowledge gathered

AGENDA SETTING

- *Deliberative Forums
- *Community visioning
- *Futures mapping

EXPLORATORY ANALYSIS AND PRE-DESIGN

- *Deliberative Forums
- *Focus Groups/Structured Interviews
- *Existing Partner Data Discovery and Assembly
- *Action Research and Ethnography

* indicates a participatory engagement activity

STRATEGY DEVELOPMENT

- *Consultation
- *Collective Intelligence (multiple forms of knowledge)
- *Stakeholder Panels/Sub-committees

DESIGN DECISION-MAKING

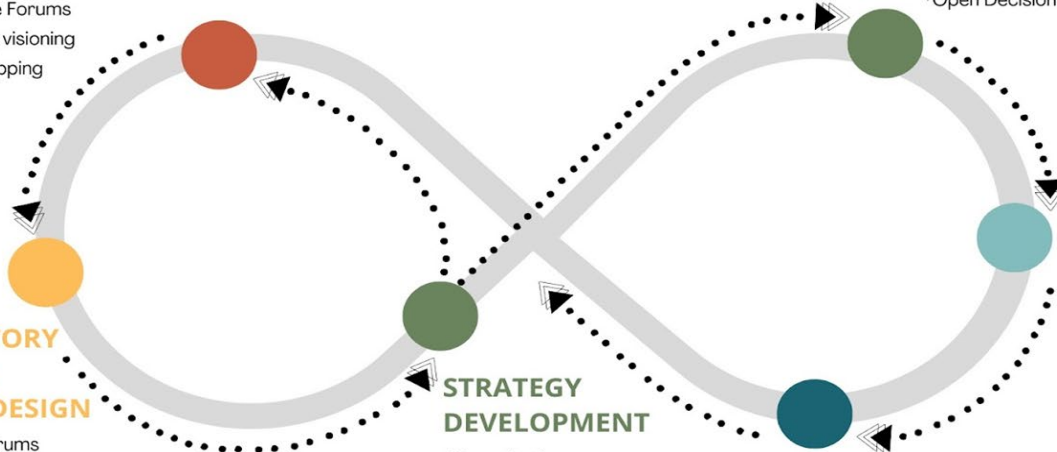
- *Consultation
- *Quantitative + Qualitative Surveys
- *Participatory Budgeting
- *Open Decision Making

IMPLEMENTATION

- *Co-development of indicators
- *Co-development of marketing and adoption strategy
- *Crowdsourcing

ITERATIVE EVALUATION

- *Collective Intelligence (multiple forms of knowledge)
- *Stakeholder Panels/Sub-committees
- *Crowdsourcing
- *Formal Audit Mechanisms



**Executing on Our
Commitments to
Productive,
Transparent and
Interactive
Processes for a
Cleaner, More
Equitable Future**



Next Steps for LADWP



Thank you!
