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POLICY

Energy Storage for Energy Justice

DILLON CRUZ

EXECUTIVE SUMMARY

Nearly one-third of all households in Los Angeles have trouble paying their monthly utility bills.[1] As the City pushes to decarbonize its power grid by 2035, these residents will have to contend with even higher electricity rates. The Los Angeles Department of Water and Power (LADWP) can combat this widespread financial burden in part by:

1. Implementing Virtual Net Energy Metering Plus, a pilot expansion of the city's Virtual Net Energy Metering program that brings local energy storage to low-income renters; and
2. Targeting at least 150 MW of local energy storage within disadvantaged communities by 2030, and incorporating this target into the 2022 Strategic Long-Term Resource Plan and the LA100 Equity Strategies initiative.

Energy storage has garnered significant interest in the energy policy world, as it is the only technology that utilities can use to dispatch renewable energy at any time and place. Historic investment is primed to accelerate adoption of energy storage across Los Angeles, with Congress rolling out billions of dollars in new funding for climate resilience, California state agencies soon requiring energy storage for all new buildings, and LADWP funneling billions of dollars toward equitable decarbonization.

The above recommendations will help Los Angeles channel these imminent funds toward the City's low-income communities at low

cost and low risk. First, the proposed Virtual Net Energy Metering Plus program incentivizes multifamily building owners to install solar-and-storage systems, with financial benefits flowing toward LADWP, owners, and renters alike. Second, the proposed 150 MW target, if fully adopted, would save both LADWP and low-income households up to $75 million annually while putting the City on track toward its clean energy goals.

By deploying energy storage directly in disadvantaged communities, LADWP can reduce monthly bills, protect residents during blackouts, create local jobs, and improve air quality for the direct benefit of low-income households.

BACKGROUND

On September 1, 2021, the Los Angeles City Council passed a motion requiring that the City's power grid run completely on carbon-free electricity by 2035, and tasked the Los Angeles Department of Water and Power (LADWP) – the nation's largest municipally owned utility – with implementing the mandate. If successful, Los Angeles would be the first major US city to fully decarbonize — a major achievement for the fight against climate change.

Projected LADWP Electricity Rates, 2021-2035

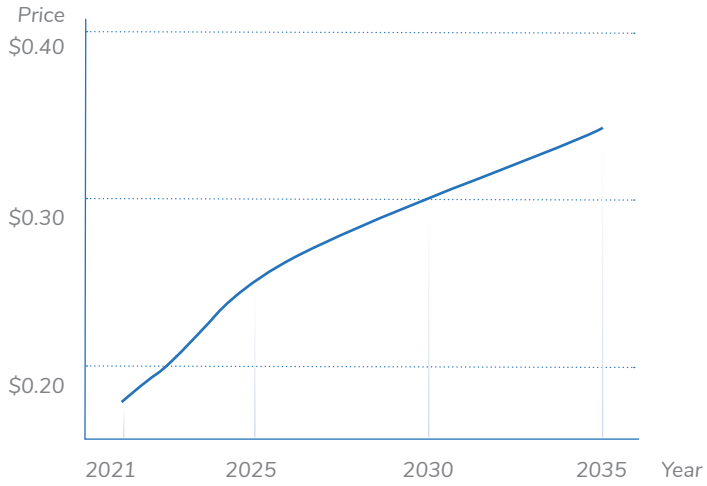

Figure 1: LADWP electricity rates are projected to increase from about 19.1 cents/kWh in 2020 to about 34 cents/kWh in 2035 due to LADWP's decarbonization strategy[2]

In implementing decarbonization, Los Angeles must ensure that it does not shift financial burden onto its most vulnerable residents. Low-income Angelenos are already grappling with widespread utility debt and stagnant wages.[3] They cannot afford higher bills, even in the face of rising heatwaves that force them to use more electricity to survive. Unfortunately, LADWP may push electricity rates up 80 percent by 2035 to cover the costs of this $87 billion decarbonization initiative.[4] Further, LADWP's typical strategies to reduce energy burdens – including providing bill discounts, improving building energy efficiency, installing rooftop solar panels, and assisting with customer debt – are dogged by persistently low enrollment rates,[5] and insufficient LADWP funding.[6] To help more low-income homes, LADWP's portfolio of equity programs needs deeper outreach, more funding, broader cross-sector collaboration, and new ideas.

A promising tool for energy justice is "local energy storage," or energy storage systems deployed on the customer or community scale to serve a single building, multiple buildings, or an entire neighborhood. Researchers have found that, by 2030, local energy storage paired with local solar could save US ratepayers $109 billion in utility costs and $120 billion in customer costs.[7] This is because energy storage is the only technology that can store and dispatch renewable energy at any time and place, enabling concepts like virtual power plants, microgrids, and non-wires alternatives. Potential benefits like lower ratepayer bills, community resilience, cleaner air, and less need for grid infrastructure are driving governmental agencies, researchers, and community advocates alike to call for greater investment in local energy storage in low-income communities.[8]

Broader market and policy forces are supportive of energy storage adoption. Residential battery costs are set to fall 56 percent by 2030[9], meaning that more low-income homes and small businesses will be able to adopt energy storage in coming years. Meanwhile, California regulators are poised to require energy storage on all new buildings in the 2022 Energy Code. In addition, state and federal incentives, such as the California Climate Investment Fund and climate resilience funding provided by the 2021 Infrastructure Investment and Jobs Act, will support cities and their residents in adopting storage with lower financial burden.

RECOMMENDATIONS

LADWP should harness local energy storage as a tool to reduce energy burden. We recommend this as a complement to, rather than a replacement of, existing equity initiatives. LADWP can take immediate action by:

1. Implementing Virtual Net Energy Metering Plus, a pilot expansion of the city's Virtual Net Energy Metering program that brings local energy storage to low-income renters; and
2. Targeting at least 150 MW of local energy storage within disadvantaged communities by 2030, and incorporating this target into the 2022 Strategic Long-Term Resource Plan and the LA100 Equity Strategies initiative.

Recommendation 1

LADWP should implement Virtual Net Energy Metering Plus, a pilot expansion of the city's Virtual Net Energy Metering program that brings local energy storage to low-income renters.

> **Specifically, LADWP should take the following action:**
>
> Design the Virtual Net Energy Metering Plus (VNEM+) pilot program and obtain Board approval to implement it as proposed in the associated Operational Plan.

The majority of Los Angeles households with utility debt are renters, most of whom live in multifamily buildings.[10] Reducing their monthly utility bills requires capital improvements like better insulation and efficient appliances, but tenants are often stymied by owners who lack aligned incentives. To overcome this well-documented "split incentives" problem, LADWP created the 2021 Virtual Net Energy Metering (VNEM) pilot program, which pays both owners and tenants of multifamily buildings when the owners sell solar energy directly to LADWP.

Allowing VNEM's participants to use energy storage would likely enhance the financial returns of the program to the benefit of owners, tenants, and LADWP alike. Dispatching renewable energy during peak

demand hours instead of during sunny hours significantly reduces utility costs. LADWP could use these system-wide savings to deliver higher monthly payouts to VNEM participants who dispatch energy during peak hours. This would achieve:

1. Greater long-term financial returns for owners in comparison to solar-only installations, especially after incorporating storage-specific subsidies like the California Self-Generation Incentive Program (SGIP);[11]
2. Lower monthly utility bills for renters, allowing them to address other financial concerns such as rent and debt; and
3. System-wide savings for LADWP itself by permanently shifting the burden of peak supply from expensive, polluting peaker plants to local energy storage systems.

The attached Operational Plan describes the proposed Virtual Net Energy Metering Plus (VNEM+) program, which allows VNEM participants to attach energy storage to their solar systems to achieve the above outcomes. We considered other alternatives for customer-facing programs, but found VNEM+ most promising because it is a simple tweak to VNEM, which makes it low-cost, low-risk, and easy to administer.

Creating a new incentive program like VNEM+ as early as possible also gives LADWP several long-term strategic advantages, including:

- *A foundation of trust and a force-multiplier for future climate technology adoption*, in which successful early adoption in low-income communities begets later adoption due to the known power of " peer influences, community effects, and word-of-mouth;"[12]
- *A vehicle for upcoming state and federal energy storage incentives*, such as clean energy and climate resilience funding from the 2021 Infrastructure Investment and Jobs Act, the expanded investment tax credit from the proposed Build Back Better Act, and energy justice funding through the multibillion-dollar California Climate Investment Fund;
- *Early insights into effective program design*, considering that novel customer-facing energy programs can take years of tinkering to

induce desired behaviors, as demonstrated by LADWP's Feed-In Tariff program's delayed effect on solar adoption;[13] and

- *Equitable participation in future grid modernization initiatives*, by enabling more low-income households to engage in the advanced stages of grid modernization, including forming microgrids, participating in energy arbitrage, and performing demand response — making their energy even more affordable and resilient.

Recommendation 2

LADWP should target at least 150 MW of local energy storage within disadvantaged communities by 2030, and incorporate this target into the 2022 Strategic Long-Term Resource Plan and the LA100 Equity Strategies initiative.

> **Specifically, LADWP should take the following actions:**
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> Target 150 MW of local energy storage for disadvantaged communities when designing the 2022 Strategic Long-Term Resource Plan and conducting LA100 Equity Strategies, and incorporate this target as an official goal.

LADWP currently plans to have 50 MW in local energy storage deployed across the entire City by 2030.[14] We believe LADWP should commit to a much higher target: in order for Los Angeles to stay on track for its clean energy mandate, the Los Angeles 100% Renewable Energy Study (LA100) calculates that, by 2030, disadvantaged communities alone should contain up to 173 MW in local energy storage.[15] This LA100 projection, while technically feasible, assumes perfect uptake by low-income households, a behavior strongly dependent on whether LADWP offers attractive incentives for adoption.

To maintain the ambitious scope of LA100 while allowing flexibility in decisionmaking, we suggest that LADWP aims for at least 150 MW of local energy storage in disadvantaged communities by 2030. If LADWP achieves this target, ratepayers could enjoy over $50 million in annual direct payments to disadvantaged communities,[16] over $25 million in annual system-wide savings,[17] and the capacity needed

to support over 400,000 low-income households during a climate-induced blackout.[18] In addition, this scale of deployment can create jobs for Los Angeles residents and, importantly, get the City much closer to its decarbonization goals by providing 150 MW of renewable energy during peak demand on a daily basis.

LADWP cannot achieve this target by sticking with its current policies. Thus, this brief proposes that the city review the below policies to facilitate additional local energy storage adoption. Before changes are made, each of these policy areas should undergo both (i) rigorous modeling and (ii) the input of low-income communities and advocates. Luckily, ongoing initiatives like the 2022 Strategic Long-Term Resource Plan and the 2023 LA100 Equity Strategies provide resources for such analysis.

In particular, LADWP should:

1. *Offer diverse financing options* — including on-bill repayment, property-assessed clean energy financing, and alternatives from nonprofit-, philanthropic-, and private-sector partners — to help households more easily invest in storage without needing significant upfront capital;

2. *Create attractive compensation mechanisms and customer-facing programs focused on storage* to encourage low-income households to adopt solar+storage instead of standalone solar when possible;

3. *Engage in deeper outreach, education, and trust campaigns* by partnering directly with advocates and community-based organizations to influence customers to adopt storage as soon as it is economically viable;

4. *Allow for novel models of ownership and control*, including the likes of shared front-of-meter distribution-level batteries, third-party leasing, virtual subscriptions and other innovations, which can help low-income homes overcome split incentives, poor housing stock, and lack of capital; and,

5. *Engage in fundamental changes to LADWP rate design*, which could dramatically shift the price signals driving the LA100 models and current LADWP customer behavior, as well as the amount of LADWP funding available for its equity initiatives.

ENDNOTES

1 Silvia R. González, Paul M. Ong, Gregory Pierce, and Ariana Hernandez, "Keeping the Lights and Water On: Covid-19 and Utility Debt in Los Angeles' Communities of Color," *UCLA Luskin Center for Innovation*, May 2021, 12, https://innovation.luskin.ucla.edu/wp-content/uploads/2021/04/Keeping-the-Lights-and-Water-On.pdf.

2 In the graph "Estimated Average Rates by Pathway," the "Early & No Biofuel Moderate" line tracks the scenario most closely aligned with Los Angeles's 2035 clean energy mandate. In 2035, the line hits roughly $0.34/kWh, which is about 80 percent higher than 2020 levels. See: T. Bruce Tsuchida and Sylvia Tang, "Review of the LA100 Study," *The Brattle Group*, August 7, 2021, 46, https://ladwp-jtti.s3.us-west-2.amazonaws.com/wp-content/uploads/sites/3/2021/08/07082102/Review-of-LA100-20210807-NC.pdf.

3 Researchers found "that one-quarter to one-third of all households in the City of Los Angeles are facing financial difficulties paying for the most essential services." See Gonzalez et al. *supra* note 1.

4 See Tsuchida and Yang, *supra* note 2.

5 Los Angeles Department of Water and Power, *LADWP Rates and Equity Metrics Semi-Annual Report*, August 3, 2021, 41, https://www.ladwp.com/ladwp/faces/wcnav_externalId/au-fr-corporateperformance-emdi. This document cites 122,601 participants enrolled in the Low-Income Discount Program (LIDP), now known as EZ-SAVE. Other sources have mentioned a total of approximately 400,000 ratepayers who qualify for LIDP, meaning only 31 percent of eligible customers are enrolled.

6 Energy Efficiency for all, "Affordable Homes First: Advancing a Green New Deal for Los Angeles Renters," May 2019, 3, https://assets.ctfassets.net/ntcn17ss1ow9/6odryowizjhl5BAP-MW0vkL/e894ff0b40ee1e368d9818114c32a6fe/EEFA-LA-REPORT-Affordable-Homes-First.pdf. Energy Efficiency for All notes that LADWP must invest an additional $75 million in funds to the Home Energy Improvement Program to reach more renters. Furthermore, participants of several LADWP Board of Commissioners meetings have publicly commented on low solar penetration in disadvantaged communities due to the inability of low-income households to provide upfront capital investments in solar panel installations.

7 Christopher T. M. Clack, Aditya Choukulkar, Brianna Coté, and Sarah A McKee, "A Plan for Economy-Wide Decarbonization of the United States," *Vibrant Clean Energy*, October 7, 2021, 8–9, https://static1.squarespace.com/static/5f4637895cfc8d77860d0dbc/t/615e30a72c76f14999d159a5/1633562811272/VCE-National-Modeling_final.pdf.

8 New York Power Authority, "NYPA and Environmental Justice Groups Agree to Explore Options for Transitioning NYPA's Natural Gas 'Peaker' Plants to Cleaner Energy Technologies," October 13, 2020, https://www.nypa.gov/news/press-releases/2020/20201013-ej; Bethel Tarekegne, Rebecca O'Neil, and Jeremy Twitchell, "Energy Storage as an Equity Asset," *Current Sustainable/Renewable Energy Reports* no. 8 (December 2021): 149–155, https://doi.org/10.1007/s40518-021-00184-6; California Environmental Justice Alliance "Powering Communities of Color: Energy and Climate Justice Program,", last modified March 8, 2014, 2, https://caleja.org//wp-content/uploads/2014/03/CEJAEnergyVision_updated-030814.pdf; Talia Lanckton and Subin DeVar, "Justice in 100 Metrics," *Initiative for Energy Justice*, January 2021, 12, https://iejusa.org/wp-content/uploads/2021/03/Justice-in-100-Metrics-2021.pdf.

9 National Renewable Energy Laboratory, "2021 Annual Technology Baseline," accessed November 19, 2021. https://atb.nrel.gov/electricity/2021/residential_battery_storage.

10 See González, Ong, Pierce, and Hernandez, *supra* note 3, at 10; Los Angeles Department of City Planning, "Chapter 1: Housing Needs Assessment," *Housing Element* 2013–2021, 35–37, https://planning.lacity.org/odocument/899d18c9-eb79-4540-b3eb-1d42615394ee/ch1.pdf.

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11 Clean Energy Group, "Closing the California Energy Divide: Reducing Electric Bills in Affordable Multifamily Housing with Solar+Storage," May 2016, 3, https://www.cleanegroup.org/wp-content/uploads/Closing-the-California-Clean-Energy-Divide.pdf.

12 Marilyn A. Brown, Anmol Soni, Melissa V. Lapsa, and Katie Southworth, "Low-Income Energy Affordability: Conclusions from a Literature Review," *Oak Ridge National Laboratory* (March 2020): 45, https://info.ornl.gov/sites/publications/Files/Pub124723.pdf.

13 Julien Gattaciecca, Kelly Trumbull, and J.R. DeShazo, "An Analysis of LADWP's Feed-In Tariff Program: Lessons Learned From FiT150 and Recommendations for Program Expansion," *UCLA Luskin Center for Innovation* (October 2019): 2–3, https://innovation.luskin.ucla.edu/wp-content/uploads/2019/10/Lessons_Learned_from_FiT150.pdf?utm_source=rss&utm_medium=rss&utm_campaign=an-analysis-of-ladwps-feed-in-tariff-program-lessons-learned-from-fit150-and-recommendations-for-program-expansion.

14 Ashkan Nassiri, "Presentation regarding Energy Storage Update," October 26, 2021, Los Angeles Board of Water and Power Commissioners meeting, video, 2:32:10, http://ladwp.granicus.com/MediaPlayer.php?view_id=2&clip_id=1836.

15 Disadvantaged communities are here defined as the "25% highest scoring census tracts using results from [CalEnviroScreen]," which implies high levels of economic, health, and environmental burdens. See: California Environmental Protection Agency, "Designation of Disadvantaged Communities Pursuant to Senate Bill 535," April 2017, https://calepa.ca.gov/wp-content/uploads/sites/6/2017/04/SB-535-Designation-Final.pdf; This capacity incorporates behind-the-meter energy storage systems at facilities spanning single-family, multifamily, commercial, and industrial LADWP customers. See: National Renewable Energy Laboratory, "Data Viewer," *LA100: The Los Angeles 100% Renewable Energy Study*, accessed November 19, 2021, https://maps.nrel.gov/la100/data-viewer. "173 MW" computed using data downloaded after inputting the following Data Controls: "Local Solar and Storage" (*Select Theme*), "Customer Storage" (*Select Dimension*), "Moderate" (*Select Electricity Demand Projection*), "Early & No Biofuels" (*Select Scenario*), and "Tracts" (*Select Spatial Resolution*).

16 The $50 million estimate assumes that all 150 MW are enrolled in VNEM+, with annual production of 1689 kWh per kW; energy is purchased by LADWP at $0.08/kWh only at peak demand hours as described in the attached Operational Plan for VNEM+; and tenant apportionment is 40 percent. Total purchasing amounts to $50,670,000, with $20,268,000 apportioned to tenants.

17 With 150 MW of solar PV systems alone, the avoided costs amount to "9.1¢ per kWh generated." This $0.091 per kWh avoided cost rate is most likely an underestimate of the true value of solar+storage, given its ability to offset peak demand. Assuming a slightly higher avoided cost rate of $0.10 per kWh, when applied to 253,350,000 kWh annual production, *supra* note 16, leads to $25,335,000 in total annual avoided costs. See Gattaciecca, Trumbull, and DeShazo, *supra* note 13, at 8.

18 Average energy consumption in 2018 for low-income households was 265 kWh per month, or 8.83 kWh per day. Given this consumption rate, 150MW/600MWh in energy storage (assumes 4-hour duration)'would support 407,547 low-income households over a four-hour blackout. See: Los Angeles Office of Public Accountability, "Exploring Year 2018 Residential Water and Power Bills," April 12, 2019, slide 3, https://ens.lacity.org/opa/importantdoc/opaimportantdoc3249130140_04122019.pdf.

ABOUT THE HUB

The Aspen Tech Policy Hub is a Bay Area policy incubator, training a new generation of tech policy entrepreneurs. We take tech experts, teach them the policy process, and support them in creating outside-the-box solutions to society's problems.

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