GOLDEN OPPORTUNITY
Affordable Housing in the Solar Metropolis

EXECUTIVE SUMMARY

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GRID ALTERNATIVES
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FOR INNOVATION
Executive Summary

Los Angeles County is a national leader in the adoption of residential solar and for good reason: The region benefits from an abundance of solar power, a vast sprawl of single-family rooftops, and over a decade of California energy policy that has catalyzed an industry. Today, more than 88,000 Los Angeles County homes produce clean solar energy from their rooftops, saving tens of millions of dollars from monthly utility bills in the process. Most early adopters are higher-income households who can afford the up-front investment cost – a common technology adoption trend that has resulted in an inequitable distribution of solar and its benefits. Indeed, low-income households, or those earning annual incomes less than 80% of area median income, account for less than 1% of Los Angeles County’s residential solar capacity, even when it is these households who typically spend a higher percentage of income on energy costs and thus stand to benefit most from utility bill savings.

Lower-income households encounter a series of potentially insurmountable barriers when attempting to access the benefits of solar. Most immediately, these households are confronted with financial barriers, such as insufficient access to capital or financing alternatives. But even with the availability of rebate programs that can offset the full cost of solar, non-financial barriers such as poor roof quality may persist in preventing solar installation. Low-income renters face these same barriers and more, including an uncertain length of tenancy and thus a lack of investment motivation for equipment they may move from in the near-term; a shared rooftop that makes it difficult for any one resident to install large equipment; and a complex electrical and structural configuration that can result in a more challenging and expensive installation when compared to a single-family home. As Los Angeles enters the next stage of solar adoption, policy makers and clean energy and environmental justice advocates must consider the barriers that continue to challenge lower-income solar adoption, and craft deliberate policies that promote solar access and a more equitable distribution of solar benefits.

Golden Opportunity: Affordable Housing in the Solar Metropolis showcases the considerable policy opportunity available for Los Angeles County to extend solar benefits to low-income renters through the development of solar at affordable multifamily housing. In 2018, California is expected to launch the Solar on Multifamily Affordable Housing program - the largest solar for affordable housing rebate program to date – and Los Angeles will be home to the most rebate-eligible affordable housing properties of any county in the state. Together with existing rebates programs such as the Low-Income Weatherization Program for Large Multifamily, affordable housing property owners will have the opportunity to leverage state solar investment to reduce their operating costs and deliver direct financial benefits to their residents. Additionally, the report diagnoses the absence of virtual net metering in the Los Angeles Department of Water and Power’s territory as a significant obstruction of equity, and offers policy design recommendations for the implementation of a virtual net metering tariff that ensures solar access for the public utility’s more than 1.6 million multifamily customers, including affordable housing residents.
CURRENT AND FUTURE FUNDING OPPORTUNITIES FOR SOLAR FOR AFFORDABLE HOUSING

California has targeted solar investments at affordable housing since the landmark environmental policy year of 2006, when the Multifamily Affordable Solar Homes (MASH) program eventually emerged from Senate Bill 1 (Murray, 2006). The MASH program was carefully crafted to foster co-benefits, such as developing a solar workforce through required job training at each subsidized installation. Most importantly, the program provided higher rebates for solar capacity that directly benefit the tenants, incentivizing both greater solar capacity and low-income resident savings. Due to such high demand, the $216 million MASH program quickly exhausted its funding and stopped accepting new applications in 2016.

Two solar for affordable housing rebate programs remain active today: the Low-income Weatherization Program for Large Multifamily (LIWP-LMF), which provides rebates to affordable housing property owners who invest in both solar and energy efficiency upgrades, and the New Solar Homes Partnership (NSHP) for solar investment on newly constructed affordable housing. To date, more than 44 megawatts (MW) of solar capacity has been funded through solar for affordable housing rebate programs, generating significant savings for both property owners and their residents.

State solar investment at affordable housing is expected to accelerate drastically after the expected 2018 launch of the Solar on Multifamily Affordable Housing (SOMAH) program, which commits to a goal of installing at least 300 MW of new solar capacity on affordable housing, and allocates up to $1 billion over ten years to do so. With by far the largest dollar investment for low-income multifamily solar in California to date, the SOMAH program has the potential to transform the state’s affordable housing portfolio into a critical component of its clean energy economy.

SIZING THE GOLDEN OPPORTUNITY OF SOLAR FOR AFFORDABLE HOUSING IN LOS ANGELES

As California prepares to launch its largest solar rebate for affordable housing program to date, Los Angeles County – home to the most rebate-eligible affordable housing properties of any county in the state – is expected to emerge as a primary benefactor. The Solar on Multifamily Affordable Housing program, the Low-Income Weatherization Program for Large Multifamily and other active solar for affordable housing rebate programs represent an opportunity for Los Angeles County to promote solar access for low-income households and encourage an equitable component to the region’s already impressive clean energy economy.

In total, we estimate Los Angeles County and its affordable housing property owners can utilize solar for affordable housing rebate programs to:

- Install more than 68.1 MW of geographically distributed rooftop solar capacity, including 43.0 MW in Los Angeles Department of Water and Power territory
- Save more than 17,800 affordable housing residents up to $11.6 million annually on utility bill expenditures, which can be spent on other life necessities such as food, healthcare or transportation.
• Save nearly 1,100 affordable housing property owners up to $4.9 million annually in operating costs, which can be reallocated to tenant services or much-needed additional housing
• Leverage up to $220.6 million in external state solar rebate investment
• Create more than 1,800 job years for the local commercial solar industry
• Provide 3,815 job training opportunities and nearly 31,000 job training hours to individuals seeking a career in the rapidly growing solar industry

MAXIMIZING THE CO-BENEFITS OF SOLAR FOR AFFORDABLE HOUSING IN LOS ANGELES COUNTY

Affordable housing residents earn some of the lowest incomes in Los Angeles while often residing within communities exposed to the county’s worst air quality, yet these same households stand furthest from a technology that reduces costly utility bills and aims to limit the adverse environmental and health impacts of pollutant emissions. Solar for affordable housing rebate programs help to correct this environmental injustice by incentivizing property owners to construct a solar system large enough to financially benefit the low-income resident. With the financial barrier now removed, virtual net metering – a utility billing mechanism that distributes the production of a single solar system between participating customers – circumvents the remaining barriers that are unique to renters, such as a shared rooftop.

Solar for affordable housing generates additional co-benefits that can be strategically targeted to maximize welfare and justice. For example, solar workforce development programs and job training opportunities made available by the solar installations can be extended to the affordable housing residents themselves, who would benefit not just from the solar they help install, but potentially from a career pathway in a rapidly growing solar industry. In Los Angeles County, affordable housing residents are far more likely to live within communities confronted with socioeconomic factors that reinforce one’s standing while limiting class mobility, such as a higher unemployment rate, greater linguistic isolation and a lower high school graduation rate than the county at large. By learning a specific set of in-demand solar skills, similar to those found in the electric and construction trades, affordable housing residents can overcome their restrictive circumstances. Job and career advancement opportunities can be particularly transformative for at-risk affordable housing residents, such as formerly homeless individuals and families and transition-aged youth.
Co-benefits from solar for affordable housing include opportunities for environmental justice as well, by targeting clean energy investment in communities with poor air quality and high instances of adverse health effects. Los Angeles County remains home to some of the worst air quality in the country. With the country’s two busiest seaports sustaining a robust multimodal goods movement, an oil development economy that includes urban oil extraction and nine of the state’s nineteen oil refineries, and clusters of manufacturing and industrial facilities throughout, Los Angeles County residents are often exposed to elevated levels of harmful criteria air pollutants. But not all county residents experience these byproducts of a fossil-fueled regional economy equally. We find affordable housing residents who qualify for solar rebate programs are far more likely to live in communities exposed to higher concentrations of particulate matter pollution (PM 2.5 and diesel PM) – one of the most pervasive health threats in California. Exposure to such pollutants can result in serious health consequences and indeed: affordable housing residents are more likely to live in communities suffering from higher incidences of asthma and low birth weights.

POLICY RECOMMENDATIONS

The City of Los Angeles is home to 43 MW of rebate-eligible affordable housing solar capacity, with the potential to save low-income residents over $7 million in energy costs. The opportunity is as well-timed as it is significant, with both the City of Los Angeles and its municipal utility, the Los Angeles Department of Water and Power (LADWP), recently declaring the importance of equity in a rapidly changing energy landscape. Solar on affordable housing demonstrates an immediate and actionable strategy for achieving energy equity for the benefit of historically underserved residents and customers.

Still, for the City of Los Angeles and LADWP, there remains a disconnect between intention and ability to achieve such goals, as current utility policy stands in direct conflict with energy equity. More specifically, without the availability of virtual net metering, there is no mechanism for the more than 1.6 million LADWP customers (46% of customer base) living in multifamily settings, including affordable housing residents, to access the benefits of solar.

Virtual net metering is a common utility billing mechanism that allows multiple customers to share in the benefits of a single solar system. The unavailability of virtual net metering has two adverse policy outcomes:

1. Energy inequity, and the ease at which upper-income homeowners can install solar and experience financial savings, while lower-income renters find it near impossible. Almost half of LADWP customers live in multifamily settings, with renters earning less than half the median income of homeowners.

2. Potential external investment loss. For example, the Low-Income Weatherization Program for Large Multifamily offers a rebate of up to $3.50 per watt for the portion of a system that delivers direct financial benefits to affordable housing residents and $1.50 per watt for the capacity that offsets the non-resident common area load. In the absence of a virtual net metering tariff, the City of Los Angeles and its public utility could be forgoing up to $116.7 million in external state solar investment.
To promote energy equity and to maximize state investment, we recommend LADWP prioritize the implementation of a virtual net metering (VNEM) tariff with a broad definition of qualifying customer. In anticipation of community solar and other energy equity programs, the qualifying customer, or the customer eligible to benefit from the shared solar system, should include all customers within the LADWP service territory, regardless of the location of the solar array. Utilities and other electric service providers across Colorado and Minnesota can serve as models for a broad qualifying customer definition that maximizes solar access and unlocks a community solar segment that is quickly becoming a mainstream driver of the U.S. solar market. If the utility chooses to move forward with a pilot VNEM program, we recommend affordable multifamily housing serve as the pilot participants, so that property owners can immediately access higher solar rebates.

Furthermore, affordable housing operators with properties within the service territories of Los Angeles County's municipally owned utilities (MOU) only qualify for one solar on affordable housing rebate program - the Low-Income Weatherization Program for Large Multifamily (LIWP-LMF). The program is a vital funding source for solar on affordable housing located in Los Angeles, Burbank and other cities that administer an MOU.

The LIWP-LMF is a unique program in that it does not have an have a continuous allocation of funding. Instead, legislators must determine funding annually. With the program set to expire in summer 2018, legislators are not evaluating program extension. Considering the importance of this single rebate program to LADWP and other Los Angeles County municipal utilities, we encourage all relevant stakeholders to actively support the extension of the LIWP-LMF and urge legislators to set funding that creates more financial certainty for affordable housing property owners.

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1 The average rebate-eligible affordable housing resident lives in communities with an average 12.7% unemployment rate compared to 10.1% rate county-wide, 26.0% limited English-speaking households compared to 10.3%, and 36.6% of population over 25 with less than a high school education compared to 24.2%. Based on CalEnviroScreen 3.0 data.
2 Los Angeles is among the top five most polluted regions nationally. (American Lung Association. "State of the Air 2016").
3 The average rebate-eligible affordable housing resident lives in communities with an average: PM2.5: 83% concentration percentile compared to 67% population-weighted concentration percentile for Los Angeles County; Diesel PM: 93% compared to 69%. Based on CalEnviroScreen 3.0 data.
4 Affordable housing resident live in communities with an average: Asthma: 65.4 emergency department visits per 10,000 compared to 52.2 for the Los Angeles County; Low birth weights: 6.2% low birth weight compared to 5.3%. Based on CalEnviroScreen 3.0 data.
5 Los Angeles’ Sustainability Plan – the pLAn – calls for specific improvements and investments to help remedy a disproportionate share of the negative environmental consequences in our communities, including raising air quality and improving neighborhood conditions while delivering benefits from the green economy to low-income communities. LADWP is committed to providing clean and reliable water and power to all our customers. Through the recently established Equity Metrics Data Initiative (EMDI), LADWP can assess how programs, services, and resources are distributed and used throughout the city, both geographically and demographically, to see whether any disparities exist.
6 Over 46% of housing units in the City of Los Angeles are 5 or more units. The median household income for City of Los Angeles renters is $36,489 while the median household income for homeowners is $84,975. (U.S. Census Bureau. 2015 American Community Survey.)
7 Starting in 2017, community solar is expected to consistently drive 20% - 25% of the annual non-residential PV market and become a half-gigawatt annual market by 2019. (Greentech Media. “U.S. Community Solar Outlook 2017”.)
APPENDIX

Maps of Affordable Housing Rooftop Solar Capacity in the City of Los Angeles
## Aggregate Affordable Housing Rooftop Solar Capacity across Los Angeles County

### Aggregate Solar Capacity

<table>
<thead>
<tr>
<th>Utility</th>
<th>Total Capacity (kW)</th>
<th>Total Rebate-Eligible Capacity (kW)</th>
<th>Maximum External Investment</th>
<th>Maximum Annual Tenant Savings</th>
<th>Maximum Annual Common Area Cost Savings</th>
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<tbody>
<tr>
<td>Los Angeles Department of Water &amp; Power</td>
<td>62,273</td>
<td>42,993</td>
<td>$139,160,902</td>
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<td>Southern California Edison</td>
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<td>1,103</td>
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<td>634</td>
<td>$1,886,989</td>
<td>$99,113</td>
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<tr>
<td>Pasadena Water &amp; Power</td>
<td>1,306</td>
<td>494</td>
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<td>$91,429</td>
<td>$63,953</td>
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<tr>
<td>Azusa Light &amp; Power</td>
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<td>331</td>
<td>$1,158,461</td>
<td>$61,316</td>
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<tr>
<td>City of Vernon Municipal Light Department</td>
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<td>79</td>
<td>$275,593</td>
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<td>Los Angeles County Total</td>
<td>115,363</td>
<td>68,142</td>
<td>$220,649,327</td>
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*Estimated rooftop solar nameplate capacity*
Affordable Housing Rooftop Solar Capacity in Los Angeles City Council Districts 1, 13 and 14

Affordable Housing Aggregate Solar Capacity* (by census tract)

Affordable Housing Property Locations *
- Affordable Housing Inside Disadvantaged Community
- Affordable Housing Outside Disadvantaged Community

*Estimated rooftop solar nameplate capacity
*Properties within disadvantaged communities (DAC) qualify for all current solar rebates. Those outside of DACs may qualify if residential income requirements are met.

<table>
<thead>
<tr>
<th>City Council District</th>
<th>Total Capacity (kW)</th>
<th>Total Rebate-Eligible Capacity (kW)</th>
<th>Maximum External Investment</th>
<th>Maximum Annual Tenant Savings</th>
<th>Maximum Annual Common Area Cost Savings</th>
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<tr>
<td>1</td>
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Golden Opportunity: Affordable Housing in the Solar Metropolis

Affordable Housing Rooftop Solar Capacity in Los Angeles City Council Districts 3, 8, 9, 10 and 12

City Council District | Total Capacity (kW) | Total Rebate-Eligible Capacity (kW) | Maximum External Investment | Maximum Annual Tenant Savings | Maximum Annual Common Area Cost Savings
--- | --- | --- | --- | --- | ---
3 | 3,410 | 552 | $1,887,101 | $98,643 | $47,846
8 | 4,345 | 3,729 | $12,909,628 | $681,853 | $301,470
9 | 4,329 | 4,150 | $12,860,343 | $673,280 | $242,231
10 | 3,569 | 2,937 | $10,236,648 | $540,763 | $285,932
12 | 4,460 | 45 | $158,093 | $8,368 | $5,435

Affordable Housing Aggregate Solar Capacity (by census tract)

Affordable Housing Property Locations
- Affordable Housing Inside Disadvantaged Community
- Affordable Housing Outside Disadvantaged Community

*Estimated rooftop solar nameplate capacity
*Properties within disadvantaged communities (DAC) qualify for all current solar rebates. Those outside of DACs may qualify if residential income requirements are met.
Affordable Housing Rooftop Solar Capacity in Los Angeles City Council Districts 2, 4, 5, 6, and 7

Affordable Housing Aggregate Solar Capacity* (by census tract)

Affordable Housing Property Locations*
- Affordable Housing Inside Disadvantaged Community
- Affordable Housing Outside Disadvantaged Community

*Estimated rooftop solar nameplate capacity

Properties within disadvantaged communities (DAC) qualify for all current solar rebates. Those outside of DACs may qualify if residential income requirements are met.

<table>
<thead>
<tr>
<th>City Council District</th>
<th>Total Capacity (kW)</th>
<th>Total Rebate-Eligible Capacity (kW)</th>
<th>Maximum External Investment</th>
<th>Maximum Annual Tenant Savings</th>
<th>Maximum Annual Common Area Cost Savings</th>
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<tr>
<td>5</td>
<td>197</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>6</td>
<td>4,299</td>
<td>3,422</td>
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<tr>
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Executive Summary
### Affordable Housing Rooftop Solar Capacity in Los Angeles City Council Districts 11 and 15

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<tr>
<th>City Council District</th>
<th>Total Capacity (kW)</th>
<th>Total Rebate-Eligible Capacity (kW)</th>
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<td>15</td>
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Affordable Housing Aggregate Solar Capacity
(by census tract)

- **< 100 kW**
- **> 100 kW**
- **> 500 kW**

Affordable Housing Property Locations

- Affordable Housing Inside Disadvantaged Community
- Affordable Housing Outside Disadvantaged Community

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*Estimated rooftop solar nameplate capacity

*Properties within disadvantaged communities (DAC) qualify for all current solar rebates. Those outside of DACs may qualify if residential income requirements are met.