Community Scale Solar & Energy Resilience in California's Disadvantaged Communities

Observations from a Collaboration Between UCLA and Community-Based Organizations in Los Angeles County

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Executive Summary

This paper identifies a set of recommended changes to California's community solar programs and related regulations to advance a just energy transition for low-income, disadvantaged, and vulnerable communities.

Recommendations include:

- Direct funding for community-based organizations (CBOs) to lead planning and outreach
- Expanded funding for community solar installations
- Establishment of construction targets for community solar based on spatial analysis of low-income and renter households in disadvantaged communities, accounting for future electrification of appliances and vehicles
- Development of a statewide mapping tool to facilitate CBOs and local governments in citing community solar
- Greater access to grid data to support project siting, and to prioritize distribution infrastructure investments to support such projects
- A change to CPUC rules to permit solar installations to function as both community solar and microgrid resilience centers[1], as the most economical way to provide both these essential services, particularly in urban areas
- The addition of high heat as a resiliency category for SGIP

[1] Behind-the-meter solar and storage systems that supply emergency power to a building and/or property. Alternatively called resilience centers or microgrid resilience centers.

Context & Project Description

California's legislative commitment to a "just and equitable" energy transition is laudable, but the ultimate socio-economic effects of the transition on the state's disadvantaged and vulnerable communities (DVCs) will depend on how notions of 'equity' and 'justice' are operationalized in policy.

Our team recently completed a project, funded by the California Strategic Growth Council (SGC), that explored the current frontiers of possibility for DVCs to participate in the energy transition. The project team consisted of The California Center for Sustainable Communities at UCLA, the non-profit organization Liberty Hill Foundation, and the following community-based organizations (CBOs) representing a diverse set of DVCs throughout Los Angeles County: Active San Gabriel Valley, Asian Pacific Islander Forward Movement, East Yard Communities for Environmental Justice, Pacoima Beautiful, Redeemer Community Partnership, Social Justice Learning Institute, and T.R.U.S.T South LA.

In the course of this project, community solar systems and resiliency centers were identified as high priorities for DVCs. These types of installations are attractive because they do not place the burden of implementation upon renter households, or even on homeowners in DVCs, many of whose homes may not be structurally fit to support roof mounted PV systems. The proportion of renters and the condition of housing stock in DVCs have been identified in other, previous studies as major barriers to adoption of renewable technologies in these communities.

The project team worked together to build a site selection and evaluation tool for use by communities and other entities interested in developing community energy systems. Other elements of the project involved examining existing utility programs such as the Disadvantaged Communities Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT) to assess the value and usefulness of these programs in the buildout of community solar in DVCs.

After the team was formed, the project proceeded in three phases. The first involved an intensive "Energy 101" introduction, taught by UCLA team members, which presented information about the electric power grid, renewable energy technologies, and explanations of policies and regulations that organizations need to understand in order to interface with electric service providers regarding the construction and operation of community energy systems. The second phase involved the collaborative creation of a web-based geographic information system (GIS) tool to help identify and prioritize suitable sites for community solar assets and/or resilience centers within disadvantaged

communities. The third and final phase consisted of developing a set of case studies, during which CBO team members began the process of recruiting site hosts and designing community solar systems or resiliency centers. The object of this activity was to assess barriers to implementation by advancing the system plans as far as possible. The team also learned a great deal in the course of the project about the shortcomings of the CSGT and DAC-GT programs; specifically, about how their designs make community-led efforts in urban areas extremely difficult.

The existence (and persistence) of some barriers to DVCs' participation in the energy transition (including the lack of renter agency to install solar, discouragingly large transaction costs, and the dearth of financing options) are well known. Our collaboration on this project, however, revealed additional insights; ultimately, the team concluded that the programs and funding currently on offer from the utilities and the State to 'include' disadvantaged communities in the energy transition are woefully inadequate. Furthermore, an analysis using the GIS tool suggests that grid constraints will severely limit deployment of DER systems County-wide, and that their effects will be felt most acutely in lower-income areas where current levels of distributed rooftop solar PV adoption are far below average, and the need for community solar and resilience centers is highest.

In the following sections we discuss the development of the GIS tool, findings from the case studies, and the reasons why existing community solar programs fail to overcome the barriers to DVC participation in the energy transition. We then make a series of recommendations for how to reform community solar and resiliency center programs based on the experiences of the project team. We also discuss (with reference to UCLA's research and that of others) some persistent points of confusion and blind spots in conventional thinking about energy policy, and the decarbonization of people's domestic lives.

Collaborative Tool Development

A just energy transition requires an integrated approach to technological, social, economic, and governance challenges. Collaboration between academic teams and community-based organizations is an essential aspect of the transition, since these collaborations link the data and tools available to university researchers with the vast stores of lived experience and on-the-ground knowledge of groups representing the communities most negatively impacted and burdened by fossil fuel consumption. These partnerships can enrich and amplify research products, build and enhance the capacity of all organizations involved, and make substantive contributions toward a just transition.

To this end the project included two-way knowledge building elements, and a collaboration on a web-based GIS tool designed to provide essential information to organizations developing (or considering developing) community energy systems. Project meetings were based on a public-participatory geographic information system (PPGIS) framework. To create a site selection tool that was actually useful for the team's CBO members meant that the needs, desires, and preferences of their communities, vis-a-vis energy, needed to be central to project discussions. In turn, the information contained in the Energy 101 course provided CBOs with the knowledge required to engage with electric service providers and public agencies regarding the energy transition in DVCs. Discussions about the grid also served to underscore the importance of community solar and resilience centers to all participating. Conversations between team members about community needs and how to address them ranged widely; they included the condition of building stock in DVCs, household composition, attitudes towards solar technologies, building electrification, and "peaker" power plant operations, among other topics.

Results of Tool Application

Following the educational and tool development phases of the project, the team's CBO members used the tool to conduct a table-top exercise in which they identified a set of candidate sites for community solar installations or resiliency centers in their own communities. Several CBO members also went on to develop more detailed studies, which included contacting site owners, soliciting input from community leaders, and conducting site visits to develop system designs and estimates of solar potential. Potential sites considered by the CBOs were mostly publicly-owned or oriented properties - fire stations, parks, schools, churches, etc.

The exercise revealed much higher than expected "soft" transactional costs associated with community-driven development of distributed energy systems. The team learned that local governments, school boards, religious organizations, and other potential site hosts are quite interested in the financial and resiliency benefits of DER technologies. However, the project team also discovered that a surprising number of bureaucratic hurdles needed to be cleared before the assessment of a site's potential to host either type of system could begin. As the exercise progressed, it became increasingly clear that getting all parties (the community, the site host, and contractor) to agree on a system design, and then to determine precisely what a chosen site could support in terms of system capacity were prohibitively laborious and time-consuming tasks. Both require carefully structured communication amongst the parties involved in building and operating the system, as well as extensive community engagement. So demanding are

these steps, in fact, that the team's CBO members would not have had the time to even participate in the tool application phase of the project without dedicated funding from the SGC.

In order to learn more about the applicable utility community solar programs, representatives from both Southern California Edison and The Clean Power Alliance (CPA), the regional Community Choice Aggregator (CCA), were invited to make presentations to the project team about their organizations' program offerings. The presentations did not address the design of the programs themselves, or barriers to low-income community participation. The information that representatives from SCE and the CPA provided about their community solar programs and application processes underscored how difficult it is for DVCs to participate in them.

In addition to using the GIS tool for local siting of solar installations, we conducted a larger scale analysis, to understand the potential for rooftop community solar and the extent to which grid capacity will limit build-out. Our calculations showed that approximately 3.5GW of technical solar potential is available on the existing rooftops and parking lot areas of institutional, government-owned, and community-oriented properties in LA County SCE territory. However, buildout of this technical potential will be substantially constrained by current grid capacity and Rule 21 interconnection protocols as implemented by SCE.

Using data from SCE's Distribution Resources Plan External Portal (DRPEP) we determined that **33% of the total solar potential would be constrained for development as Community Solar based on circuit ICA capacity and 86% would be constrained for development as Resilience Centers based on Rule 21 implementation.** While additional detailed studies by the utility might ultimately allow solar installations beyond the screening capacity limits, the additional time, cost, and uncertainty associated with such studies means that there is little likelihood that CBOs will have capacity to pursue them. Overall, these constraints have a disproportionate impact on DVCs, because of the importance of community solar and resilience centers to advancing the energy transition in these neighborhoods.

Overall, the collaboration between UCLA and the CBOs showed that state policy has not alleviated the difficulties that DVCs face in their attempts to adopt DER systems. It is clear that without significant changes to program structure and funding, the state will not achieve its objectives for a more just transition.

Shortcomings of Current Policies & Programs

Stepping through the process of proposing and designing community solar and resiliency systems in DVCs reveals why so few projects have actually been built:

Lack of Up-Front Funding For Community Organizations to Lead Projects

Successfully designing and bidding a community solar or resiliency project is a considerable investment of time and resources. Initiating a project involves recruiting a willing site host, engaging with the community the system will serve, enrolling tens to hundreds of participants, interfacing with solar contractors, etc. Managing the execution of DER projects is simply overwhelming for most community-based organizations. Nearly all CBOs are nonprofits, and do not have capital reserves to draw upon for preparing bids for competitive programs.

Currently, marketing, education, and outreach (ME&O) funds are available under the CSGT program. These funds, however, are made available to potential community sponsors only after the organization submits a Letter of Commitment. The considerable time and labor costs required to submit this letter are not covered by ME&O funds, only the subsequent outreach and recruitment work to enroll participants. The potential energy cost savings for project enrollees and site hosts are not enough to justify preparing bids. The lack of up-front funding for community based organizations effectively prohibits them from leading ‘community’ projects.

Community Solar Programs Cater to Solar Developers, not Disadvantaged Communities

The CPUC’s community solar programs are tailored to the interests and capabilities of solar developers, not community groups. DAC-GT and CSGT’s designs, capacities, and utilization records clearly show that they are intended to gauge the interest of solar developers in DVC projects, and only indirectly help disadvantaged communities to reduce energy cost burdens and protect the health and safety of their residents. Current DVC community solar programs are structured so that developers lead projects and community groups are recruited for their support and outreach.

Tellingly, both CPUC DVC solar programs also do not feature any goals or targets related to community resiliency or total individual/ household enrollment. This is unacceptable for programs that are ostensibly intended to help ease the energy

burdens of low-income Californians, many of whom cannot (for reasons stated previously) participate in single family net energy metering (NEM) tariff programs.

In addition to ignoring the organizational and fiscal challenges facing community-led efforts, community solar installations in urban areas face additional barriers because of how existing programs treat capital costs. These include a lack of transparency relating to cost caps (project cost per kW or kWh capacity thresholds for selecting and funding projects) and electricity prices for community solar systems. Urban rooftop solar installations tend to be more costly than ground mounted installations on undeveloped land since urban installations involve additional labor and soft costs, and require lease agreements to gain access to rooftop space. These factors make them unattractive to solar contractors whose foremost concern is minimizing costs to achieve a winning bid.

There Are No Obvious Plans to Scale-Up DAC DER Programs

Setting aside criticism of the developer-oriented application and bidding processes, other shortcomings include the very modest capacities (in terms of megawatts and dollars) of current programs, and the apparent lack of any initiative to scale-up modified versions of them.

DVC residents are facing escalating energy costs and intensifying environmental hazards (heat, wildfire, more frequent service outages, etc.) However there seems to be no urgency (at least at the state level) to transform the existing pilot programs into policies that will help alleviate the energy cost burdens and environmental hazards facing DVCs.

Without a plan that integrates what is known about the need for various kinds of DER systems, the barriers to community and resident participation, policy goals measured in terms of benefits to people, and timeline for implementation, no progress will be made. Judging from the fact that **no new generation assets have been installed under the DAC-GT and CSGT programs** as of the Evergreen Economics program review report (March 2022) it is clear that policy changes to encourage urban rooftop development are also necessary.

Current Community Solar Programs Provide No Resilience Benefits to the Communities that Host Them

Another major flaw, from the perspective of urban communities, is the hard distinction between **in front of the meter** community solar assets and **behind-the-meter** resiliency systems. Community solar systems supply wholesale power to the grid, and

the benefits of its generation and sale are virtually allocated to the system's subscribers. Battery storage is integral to resiliency systems that provide emergency energy services in the event of prolonged outages or other disasters. However, no system can, under the current regulatory framework, provide both kinds of benefits. **In fact, the community solar programs prohibit the inclusion of storage**. In an urban context, a system that provides benefits from generation and sale *and* community resiliency is the most efficient use of resources and space. Allowing for the construction of such hybrid systems would also potentially help community organizers and solar contractors economize on the amount of marketing and outreach work needed to enroll subscribers and raise awareness about the benefits of resilience and community solar.

Allowing community solar systems to be paired with storage is also especially important in light of the increasing number of heat days, and the stress such conditions will put on the grid. Sites that are able to host resilience centers are in limited supply, and communities should be allowed to extract maximum value from them.

Lack of Grid Capacity Data for the Design & Siting of Resilience Centers

Finally, much of grid capacity data that communities and municipal governments need to design and site resilience centers is not freely and publicly available. The lack of transparency regarding the interconnection of behind-the-meter systems is bound to hamper local efforts to build such systems. For example, SCE does not expose information about minimum historical loads for distribution circuits through its DRPEP map despite the option of using these data under its Rule 21 fast track supplemental review. This information is only available on a case-by-case basis, after submitting an interconnect application and a $300 fee.

The lack of transparency about interconnection is already causing problems for DVCs and local governments who want to include the building of resilience centers as part of climate adaptation or sustainability plans. Many local governments do not understand the constraints on the building of resilience centers, and end up creating plans and policies that cannot be implemented as written (e.g., LA County's Safety Element calls out building resilience centers, but includes no mention of constraints on siting). The lack of information about grid capacity eventually risks exposing DVC residents to dangerous levels of high heat in the event of an extended service interruption.

Recommendations

Our project finds that major rule changes must be made if the state is to meet its commitment to helping DVCs benefit from solar and storage DER technology.

1. Funding should be made available up-front for CBOs to engage with their communities and enlist contractors and site hosts. Community-based organizations are well-positioned to lead DER system development projects in disadvantaged communities. Dedicated funding for initial community outreach and planning will help make the development of DER systems truly community-led projects.
2. More funding should be available to build community solar and resiliency systems in DVCs. These systems are intended to alleviate energy costs for DVC residents and ensure that they have access to vital energy services in the event of extended service interruptions. The economic viability thresholds used to award funding should be revised with these considerations in mind. Existing utility programs are not sufficient to meet community needs, and the complexity and business-oriented nature of these programs is a substantial barrier to the solar development initiatives of communities and local governments. Assembly Bill 2316, which takes up the issue of these programs by requiring the CPUC to open proceedings on community solar systems within the next year, is a step in the right direction.
3. Community solar and resilience programs must be expanded to provide DVCs with the environmental, financial, and resiliency benefits they deserve. First and foremost, this means funding these programs in proportion to the needs of communities for solar and resilience services. We recommended establishing program targets via statewide spatial analysis to determine the amount of community solar needed to meet the electricity consumption of the specific numbers of qualifying low-income and renter households in DAC communities. The spatial analyses would include:
    - Identifying census tracts meeting the income and CalEnviroScreen thresholds and determining the annual electricity consumption of those households
    - Applying an “electrification” factor to adjust those historical consumption values to account for the future conversion of natural gas appliances as well as the adoption of electric vehicles
    - Calculating the MW of solar PV required to meet the total annual MWh of projected electricity consumption for fully electrified households

4. Create a statewide version of the Community Solar Opportunities Mapping Tool. Such a tool fills an essential need for CBOs, local governments, and other entities striving to advance a just energy transition in under-served communities and beyond, as well as to increase resilience capacity more generally. Community groups and organizers need more information about the complexities of grid interconnection requests and approval processes, as well as the suitability of potential sites to initiate the development of community solar and resiliency systems.
5. We support continued efforts by the CPUC to make transparent through a public process the methodology, inputs, and assumptions of IOU Integrated Capacity Analyses for DERs, with the goal of better reflecting the physical capacity utilization of individual circuits. With this process in mind, we recommend that behind-the-meter threshold values calculated with more accurate and appropriate data (such as that allowed through SCE's supplemental review), should be exposed for bulk download through the DRPEP maps rather than requiring applications and payments to obtain those values on a case-by-case basis.
6. Public data on grid conditions should also include a comparison of grid capacity versus rooftop solar potential to help identify and prioritize areas for greater investment in distribution infrastructure by the utilities, since the capacity of distribution infrastructure is a major barrier to equitable adoption of DER technologies in DVCs.
7. The CPUC should revise the hard distinction between community solar and resilience systems. CPUC rules should be changed to permit solar installations to function as both community solar and resilience centers. In urban DVCs it is most economical to combine storage and generation (where possible) due to space constraints and greater soft costs. In such cases, utilities should account for the presence of storage in their interconnection protocols, using clear and defensible methods that are interpreted consistently across territories.
8. The CPUC should add high-heat exposure as a resilience category for SGIP. This would assist in the funding of resilience centers in DVCs where people must often choose between safe interior temperatures and other essential energy services.

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