Notes regarding submitting comments on this Draft Work Product:

Comments are Due April 20, 2018.

Comments shall be no longer than 5 pages.

Comments should be submitted to LDBPcomments@ebce.org

New Generation

for

East Bay Community Energy

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Introduction

The New Generation section of the Local Development Business Plan (LDBP) is intended to inform East Bay Community Energy's (EBCE's) Integrated Resource Plan (IRP) with estimates of new generation planned for interconnection to the utility grid in EBCE's service area over the 5-year planning horizon of the LDBP. In LDBP materials published to-date, recommendations have been made advising on the siting, interconnection capacity, and program features best suited to promote new generation within the service area. When paired with energy storage, generation supply-shifting, and supply-shaping service, the development of new local generation, such as rooftop solar or local wind turbines, has the potential to unlock a range of cost-saving and risk-mitigating outcomes, while simultaneously providing economic development and social justice outcomes.

A robust and well-considered IRP is essential to the financial health of Community Choice Energy (CCE, or occasionally CCA, for Community Choice Aggregation) organizations like EBCE. The IRP determines short-term and long-term energy procurement strategies for the CCE, and, therefore, must consider wholesale energy procurement needs through the lens of both local energy consumption as well as current and expected local energy production. Failure to properly plan for new energy production interconnecting to the electric grid in EBCE's service area could lead to over-procurement of less-expensive long-term energy contracts, resulting in potential curtailment situations when EBCE is contracted to purchase more energy than is consumed in its service area. Similarly, under-procurement of long-term energy contracts would result in higher reliance on more-expensive short-term wholesale energy contracts. This section of the LDBP seeks to provide a comprehensive overview of new expected generation in the service area, based upon the recommendations, estimates, and timing reflected in other LDPB sections.

New Generation Siting and Interconnection Capacity Analysis

As EBCE transitions from a wholesale procurement strategy as its primary means of serving its load towards developing new local generation from renewable energy sources, identifying potential sites within the EBCE service area, the generating capacities of those sites, and the technology fit with EBCE needs are essential to the LDBP and IRP planning process. The LDBP has presented an analysis of potential sites for new generation across Alameda County as part of the Solar and Wind Siting Surveys.

This section aims to aggregate our findings and highlight the generation potential of each technology and its relative Levelized Cost of Energy (LCOE). Readers should also reference the Recommendations for Optimizing the Integration of DER Development with Procurement and Scheduling and Recommendations for Capacity Building sections of the LDBP for the fullest perspective on how new local generation intersects with resource planning. These documents provide more insight into the recommended processes involved with developing new local generation assets and related implementation timelines, as well as approaches to incentivizing

new generation and innovative asset ownership models that bolster the local workforce and economy, and that provide pathways to equity for EBCE customers.

Siting Results

As noted above, an important outcome of the development of the LDBP is the creation of an understanding of local energy generation potential with current technologies. By understanding where these technologies can be installed, when they can be interconnected to the grid, and how much power and energy capacity they can represent, the IRP can better forecast future wholesale energy needs and EBCE can better plan its programs and initiatives.

The table below captures the results of our siting surveys and outlines a range of the Levelized Cost of Energy for each technology type.

Table 1: New Generation Capacity Summary

Technology	Total Potential Generation Capacity	Planned Generation Capacity through LDBP Programs in 5-Year Planning Window (estimated)	LCOE ($/kW)[1]
Solar	650 MW (sites > 1000 kW-AC)	144 MW	$0.10-$0.156
Wind	110 MW	12 MW	$0.10-$0.24
Biofuels	11 MW[2]	0 MW	$0.092-$0.119
TOTAL	**771 MW**	**156 MW**	

Using estimated sequencing of local generation installation as proposed in various draft sections of the LDBP, the expected local new energy generation has been modeled in the table below. As programs get implemented on schedules, and with budgets, different from those proposed, results will vary. However, for IRP planning purposes, these numbers can be used for short-term and mid-term planning, as well as for understanding bounds of long-term procurement planning.

Table 2: Estimated Phased New Generation from LDBP-associated programs

	Solar (MWh)	Wind (MWh)	Annual Total (MWh)	Cumulative Total (MWh)
Year 1	**7,500**	**0**	**7,500**	**7,500**
Year 2	**36,000**	**2,000**	**38,000**	**45,500**
Year 3	**72,000**	**8,000**	**80,000**	**125,500**
Year 4	**70,500**	**10,000**	**80,500**	**206,000**
Year 5	**30,000**	**4,000**	**34,000**	**240,000**

[1] LCOE assumption: 20-year weighted price for energy value to break even on investment. See: LDBP draft section Task 1-LCOE Narrative at *https://ebce.org/local-development-business-plan/*

[2] Estimated at the same maximum capacity as biofuel gas plants currently in use by East Bay Municipal District. See: Fenster, Tommy. *Managing Organic Waste Streams and the Role of Biogas in Decarbonization.* 2017. Whitepaper by StopWaste organization.

Solar Photovoltaic

The LDBP Solar Siting Survey was used to identify technical siting potential for commercial-scale solar photovoltaic (PV) installations throughout Alameda County. The survey was supplemented by an Integration Capacity Analysis (ICA) of the nearest feeder line for each of the identified solar sites. By combining the ICA data with analysis of prospective solar sites, the Solar Siting Survey highlights the optimal locations to connect local solar to the electric grid, where the siting opportunity is excellent and interconnection is likely to be quick and cost-effective.

The goal of this survey was to identify feasible, commercial-scale sites for installing 1,000 kW (AC) or larger solar PV systems within the built environment. By highlighting high-quality PV siting opportunities, this survey is designed to guide the development of cost-effective local solar generation within Alameda County. The scope covered all urban areas of the county with the exception of the City of Alameda, which has its own municipal utility.

The Solar Siting Survey identified over 650 MW (AC) of technical PV siting potential on over 250 discrete sites throughout EBCE's service territory. A site is defined as a unique address (or group of related addresses) with the potential to host at least 1,000 kW (AC) on rooftops, parking lots, parking structures, and logical aggregations thereof. Note that the technical solar siting potential will be reduced by constraints that were not considered, such as structures that cannot support extra weight without a significant upgrade and grid bottlenecks that would result in excessive solar curtailment (or require time-shifting dispatchability via energy storage). The results of the Solar Siting Survey are included in an interactive Google Earth map that is available to EBCE staff and to the community.

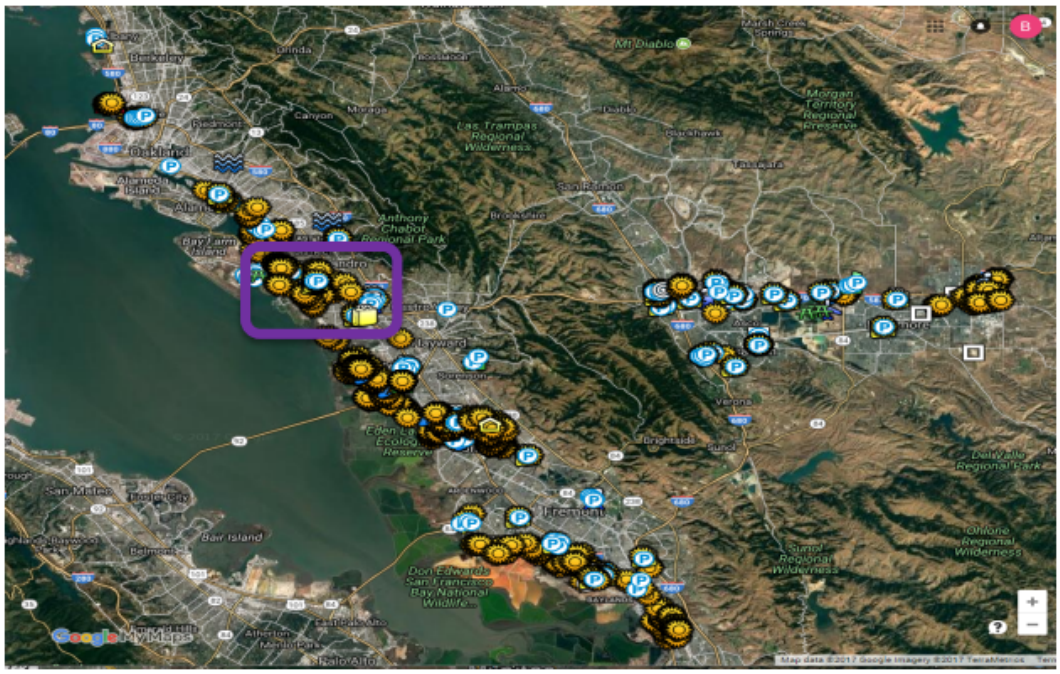

Figure 1. Snapshot of Solar Siting Survey results, from Clean Coalition's draft LDBP "Task 1 EBCE Solar Siting Survey summary report"

Solar LCOEs range from $0.10/kWh for large ground mount systems in the sunnier eastern side of the County to $0.156/kWh for smaller rooftop systems along the Bay. Incentivizing local DER through a Power Purchase Agreement (PPA) was also analyzed by the Clean Coalition team. The analysis identified that a required PPA ranges in cost between $0.07/kWh for 1% participation rate to $0.27/kWh for an 87% participation rate. Market response at various pricing levels is outlined in the table below:

Participation rate (% of local solar potential identified in the EBCE Solar Siting Survey that is realized)	Required PPA rate (¢/kWh)
1%	7¢
2%	9¢
5%	11¢
11%	13¢
22%	15¢
36%	17¢
52%	19¢
66%	21¢
75%	23¢
82%	25¢
87%	27¢

Figure 2. Snapshot of LCOE impacts of Feed-In Tariff adoption, from Clean Coalition's draft LDBP "Task 3 EBCE FIT Design Recommendations"

Developing the local solar projects identified in this survey can help create a stronger, more resilient grid in Alameda County. By pairing distributed solar with other distributed energy resources, such as energy storage, demand response, and electric vehicle charging infrastructure, EBCE can partner with its member jurisdictions and commercial customers to establish community-scale microgrids and solar emergency microgrids that further enhance the value of new generation assets. These innovative configurations can be designed to provide indefinite, renewables-based, backup power to critical facilities in the event of regional power outages, and they can provide rate-stabilizing risk mitigation measures for EBCE.

Wind

Like the Solar Siting Survey, the LDBP Wind Siting Survey is available on an interactive Google Earth map that is accessible publicly. To find suitable wind development sites, the LDBP team overlaid wind-speed maps with parcel information to find large, unoccupied, publicly-owned land in high wind-speed regions in Alameda County. Once these target sites were established, standard wind turbine layout geometry was used to determine the capacity of each site and an excel-based performance model was utilized to determine the energy yield of each turbine. The survey identified 110 MW of potential wind capacity, primarily on public land, though some

adjacent agricultural parcels were included in the analysis. The wind turbine placement is focused on the two areas of the county with the highest average wind speed: the narrow stretch between I-880 and the Bay and in the northeast corner of the county near Mountain House.

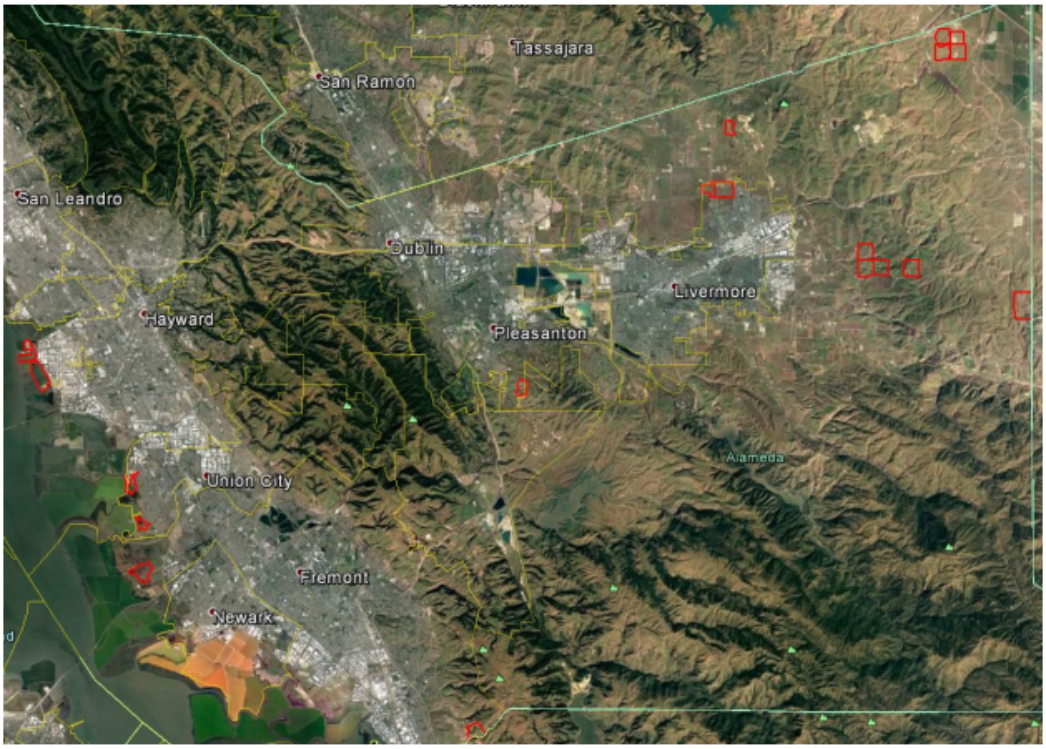

Figure 3. Snapshot from Optony's draft LDBP "Task 1 EBCE Wind Assessment Narrative"

The chart below indicates how much estimated wind capacity could be developed at various price levels:

Table 3: LCOE of Viable Wind Capacity

LCOE ($/kW)[1]	Viable Capacity (MW)[2]
$0.10	32
$0.12	52
$0.16	80
$0.24	102

Note 1 – LCOE assumptions: 20-year fixed price for energy to break even on investment

Note 2 – The viable capacity in each row is cumulative (e.g. 52 MW at $0.12 includes the 32 MW developable for under $0.10)

Biofuels

Potential study of Alameda County's ability to access landfill gas, yard waste, or other City- or County-managed feedstocks, such as biomass from wastewater treatment facilities, could be used to inform the siting of biofuel projects. The research and findings from the LDBP team's LCOE Analysis regarding the upfront capital costs and ongoing operation and maintenance costs of local energy generation from these assets has returned an LCOE range between $0.092/kWh for landfill gas to $0.106/kWh for steam turbine generation, to $0.119/kWh for gas turbine generation. The East Bay Municipal Utility District (EBMUD) provides water and wastewater services in some parts of Alameda and Contra Costa Counties. EBMUD currently uses four biogas turbines that produce approximately 7 MW, with the capacity to increase power production to 11 MW.[3] The belief is that, with technological improvements and price reductions, a similar level of production could be brought online in new Alameda County locations in partnership with EBCE.

Program Design and Features for New Local Generation

New local generation provided by a network of local Distributed Energy Resources (DERs) unlocks a range of benefits to EBCE and its customers. DERs can be leveraged and aggregated to supplement wholesale energy procurement needs while simultaneously providing grid benefits and promoting local resilience and economic development outcomes. Navigating the next five years of local resource development is a central part of the LDBP deliverables and recommendations. This section aims to revisit certain thematic recommendations of the LDBP under the lens of new generation, highlighting their costs, benefits, and recommended implementation strategies.

Incentives and Adders

The use of incentives in the form of Net Energy Metering (NEM) and Feed-in Tarif (FIT) program design is a recommendation consistently appearing throughout the LDBP. By providing a mechanism for local site owners to develop and receive compensation for energy production, a strong local renewable industry is supported. In addition to the very existence of these programs as incentives for DER development, the LDBP has proposed adders on top of the base rates to further stimulate local development with characteristics that EBCE and its communities value. The inclusion of economic benefit adders, such as supply-shift and built-environment, and social justice and community-benefit adders for low-income customers and disadvantaged communities, along with livable-wage workforce adders, have the potential to be especially impactful as incentives for new generation. When incentives under NEM are allocated based on siting considerations, or as an extra credit for dispatchable energy storage, EBCE can begin to target DER development in a way that unlocks locational benefits to the grid and addresses

[3] Fenster, Tommy. *Managing Organic Waste Streams and the Role of Biogas in Decarbonization.* 2017. Whitepaper by StopWaste organization.

market failures to ensure equitable access to the benefits of local clean energy generation for all customers.

Similarly, community-benefit adders designed to incentivize DER projects within Disadvantaged Communities (DACs), as defined by CalSeed[4] and quantified by publically accessible tools like CalEnviroScreen[5], can also lead to outcomes such as improved air quality and upward economic mobility. This concept appears in the energy storage siting strategy section of the LDBP as a recommendation for the deployment of a small-scale energy storage device equipped with smart controls into the residential market. Such a program can help EBCE meet its regulated requirements of California Assembly Bill 2514,[6] sometimes referred to as the Skinner Mandate, to place specific amounts of peak load under energy storage contract, while simultaneously creating bill savings for at-risk community members disproportionately impacted by their energy bills.

The value case for incentives and adders expands beyond community benefit when considered within the business cases for west-facing solar. The NEM section of the LDBP identifies the potential to drive the development of energy projects designed to align with EBCE's unique energy use profile during the duck neck and belly, enabling portfolio managers to offset expensive wholesale procurement of ramping assets with local resource generation.

Over time, NEM is expected to phase into new models of rate incentives for EBCE's customers, and new generation can also be incentivized through TOU rate pilots or the development of Value of Renewable Energy Pricing (VREP), or Value of Distributed Energy Resource (VDER) rate designs that incentivize the conservation or generation of local energy resources. As discussed throughout several LDBP sections, these types of pilots or rate incentives can preserve the value of behind-the-meter solar generation by acknowledging the locational and societal benefits of clean energy generation.

Power Purchase Agreements

The language and design of Power Purchase Agreements (PPAs) are an important tool recommended throughout the LDBP as a way to generate more value from local DER projects. By including buyout clauses and smart control features that enable EBCE to either transition leased assets into ownership, or to directly throttle or regulate the state of charge (SOC) of energy storage systems in times of need, EBCE can add needed flexibility within the financial and asset development planning process. If control clauses are integrated into PPA agreements, EBCE's portfolio manager can look to use stored local generation to fill the role of short-term energy contract requirements, helping to lower risk and costs within the energy procurement and scheduling process.

[4] See website: www.eda.gov/oie/ris/i6/2017/i6/ca-clean-energy.htm
[5] See website: oehha.ca.gov/calenviroscreen/how-use
[6] See website: www.cpuc.ca.gov/General.aspx?id=3462

Tapping the full potential of supply shift and shape features to deliver value to EBCE and its customer base is likely dependent upon the ability of EBCE to deploy and aggregate a network of smart feature-enabled DERs into a Virtual Power Plant (VPP), which creates economies of scales large enough to offset real-time changes in energy use or generation and enable price competitiveness with wholesale energy resources. It is also possible for EBCE to solicit these sorts of VPP services through Requests for Proposals (RFPs) for external service providers able to offer dispatchable load shaping and shifting services. Whether it is EBCE or an external party who acts as the DER aggregator, EBCE will need to work closely with its distribution system operator (PG&E) to facilitate interconnection processes, manage the asset controls, ensure safety and reliability, and enable two-way power flows. Close collaboration with PG&E can result in mutually-beneficial siting of new generation projects that reduce grid congestion and disruption risk and, in many cases, improve underlying grid resilience and stability, especially at the substation level. If successful, a VPP aggregation, and new local generation in general, has the potential to defer the needs and costs of new transmission and distribution upgrades, thereby reducing costs borne by ratepayers.

Credit Rating and Credit Enhancement

The approach of using local energy resources to offset asset upgrades can be pursued in the early days of EBCE operation, without waiting for the development of agency credit, by utilizing private investors and public-private partnerships. Collaborations between CCEs and IOUs can produce positive outcomes for both parties, as well as for the ratepayers that they serve. A clear example of this synergy at work is currently being demonstrated through the recent issuance of an RFP for the Oakland Clean Energy Initiative (OCEI), which seeks to replace a dated jet fuel-powered peaker plant with local renewable resources.[7] Such a peaker plant only operates on infrequent high-demand occasions when typical load cannot be met through regularly-planned energy contracts, and the peaker plant starts cold to meet that unexpected load. Due to the cold start and the fossil fuel source, operation of these plants is expensive and a significant source of greenhouse gas emissions in Alameda County. A successful procurement for the OCEI will support: the distribution grid (PG&E) by reducing congestion in an urban high-load area; the local generation provider (EBCE) by helping to meet resource adequacy and local generation goals and requirements; and the eventual private financier who will take advantage of tax benefits and a clear revenue stream by making the capital investment to build the project. Perhaps most importantly, the solicitation also stands as an example of the local air quality and environmental justice benefits that can be sought through the deployment of local energy projects.

Future solicitations for new generation that follow the OCEI example are a key part of the process through which EBCE can begin to build a network of DERs. Procurement practices that deploy collaborative models able to attract local partners such as schools, universities, or commercial

[7] See website: https://ebce.org/wp-content/uploads/Item-7-EBCE-Oakland-Clean-Energy-Initiative-RFO_Complete_FINAL.pdf

and industrial property owners can create the capital threshold and credit enhancements needed to develop local renewable capacity. This methodology has been introduced under the LDBP Agency as Developer collaborative procurement framework, through which EBCE can leverage the credit of its members, external funding partners and other financial counterparties to spur the development of new local generation assets while a credit rating is being established.

The revolving line of credit offered by Barclays Bank will remain a key part of setting EBCE's funding capabilities needed to meet the energy needs of the service area. When paired with strong reserve accounts (including Loan Loss Reserve funds) equipped with waterfall features that deploy pre-defined surpluses into local DER projects and programs, EBCE can promote new generation both in the near term while a credit rating is being established, and in the long term as the CCE seeks to develop its own assets, either in-house or in collaboration with partner public agencies. Ultimately, both near-term debt service and credit enhancement strategies are essential to building a strong balance sheet and protecting the financial stability needed to retain staff, offer high quality customer service, and acquire funding for new local projects.

Market Responsive Pricing

Throughout the creation of the LDBP, a recurring motif has been the concept of market responsive pricing (MRP). Local development is intended to be jump-started with significant incentives, whose prices get adjusted based upon market response. With an MRP structure, program payments or incentives that are achieving high rates of uptake will be considered overly stimulating to the market, and the price levels will be decreased. If programs are not achieving the desired goals or levels of responsiveness, the prices can be ratcheted up to nudge the market forward. In some cases, incentive levels can step down in scheduled tiers that correspond to a specific deployment metric being reached, as has been done with both the California Solar Initiative (CSI) solar rebate program and the Self-Generation Incentive Program (SGIP).

The MRP concept enables EBCE to ensure that it is not drastically over-paying to stimulate the market, while also creating a mechanism to ensure that program goals can be met. As program goals change over time, MRP allows incentive levels to be adjusted at the same time, maintaining alignment between incentive levels and results.

Pay for Performance Contracting

During the intermittent phase when EBCE is working to build reserves and a credit rating, pay for performance (P4P) contracting is recommended as a way to acquire the external capacity needed to service energy efficiency or load shaping and shifting services. By deploying RFPs that are contingent on performance, and that integrate a pre-and post-data analysis and measurement and verification (M&V) process, EBCE can partner with non-profits, energy service companies (ESCOs), or other private sector energy service providers (ESPs) to tap into existing or newly developed energy services with little or no upfront costs or risks. The CCE industry is evolving rapidly and many best-in-class technology and service providers have seen past the initial perception of risk working with CCE's during their early startup years, and have been willing to

work at-risk under performance-based contractual arrangements. These partnerships will create a technology agnostic approach to servicing load and new generation within EBCE's operational practices, allowing for the organization to be flexible as innovations in the efficiency and effectiveness of emergent technology, such as energy storage, continues to evolve and improve.

Contracting of outside expertise can also prepare EBCE to respond to market disruptions alluded to by the activities of peer-to-peer energy exchanges and transfer credits seen within the developing business models of organizations such as LO3 energy and other blockchain or token-based distributed energy generation projects. This will ensure that, as customer-driven exchanges continue to be piloted, EBCE is insulated from first-mover risk that may come with adopting innovative generation and billing models. A technology-agnostic approach that looks to performance-based contracts also has the potential to enable EBCE to retain its value as a service provider able to act as the load-serving agency through which its customers access or sell their power. By setting appropriate procurement policies, EBCE can become a conduit through which customer driven generation accesses the local or wholesale market.

Community Solar

The development, financing, and ownership models involved with local renewable energy generation continue to innovate and evolve to meet customer and utility needs. Among these models, Community Solar programs are becoming an increasingly adopted model for sourcing new generation for utilities and other load-serving entities (LSEs) like EBCE. Many existing Community Solar programs are designed to address market failures, such as providing access to the benefits of solar PV generation to residential and commercial customers who lack the financial or logistical ability to install solar on their own roofs. Another issue that Community Solar advocates have sought to address is trying to develop pathways to ownership equity in local solar-generation facilities, which allow local residents and businesses to invest in those facilities and earn a long-term return on that investment

Community Solar programs have typically followed two models of rate structuring:

1) Enhanced Market Access Models

The first model applies a fixed rate for enrollment to customers and markets community solar as a premium product containing a higher portfolio standard of renewable and/or local generation. Under this format, LSEs enter a PPA with a large developer for solar energy and pass the increased cost of energy onto the customer as an Opt-Up product. This first model of community solar aims to address an "access problem" offering the ability for customers to participate in renewable energy programs. While successful in some markets, a flat-rate premium-based system prioritizes administrative ease over community ownership.

Example: MCE Clean Energy Local Sol

The Marin County-based MCE offers a Community Solar program (Local Sol) in this model, with an approximately $0.04/kWh premium to provide a 100% local solar product.[8] This opt-up program gives subscribers the ability to pay for the CCE's marginal costs for procuring commercial-scale or small utility-scale renewables in the constrained area of MCE service area.

Example: SMUD Solar Shares

The Sacramento-based municipal utility SMUD offers a similar program that requires higher payments for community solar subscribers, but then does provide a bill credit based on the amount of solar generation produced by a specified solar system.[9]

Example: LADWP LAANE Program

While shared ownership models create ownership stakes, market research from within the LADWP service area has shown that low-income customers are often uninterested or unable to afford the upfront cost of shared ownership community solar programs, even with the expectation of future return. In the case of the LADWP community, solar program designers addressed this challenge by leasing their roof space from their customers for $360 per year for their LAANE program.[10] While this solution does return capital to local residents and addresses the "access problem", it does not solve the "ownership problem".

2) Community Ownership Models

The second model of rate structuring aims to address an "ownership problem" granting customers equity and ownership in a pooled solar project when they otherwise either couldn't install a system on their rooftops or when doing so would be financially unattractive. The LDBP team has referred to this model as a Community *Shared* Solar model. Under a community shared solar model, rates and customers' bills are tied to seasonal and monthly variations in renewable generation, rather than calculated on an average or annual generation forecast as often seen in the first model of rate structuring. This program design feature makes the program more like rooftop panels, and customers enter the aggregation with the expectation that setting a fixed rate for their power through solar will result in future savings when energy costs of traditional service increase beyond the strike price of their contracted solar costs per kWh.

The PV systems linked to these shares of energy production could be built through EBCE's FIT program, which provides a fixed standing offer price that is higher than most competitive PPA's, which can help the systems overcome financial hurdles. These obstacles include the building of investor confidence needed to get low-cost financing from standard financiers who can leverage tax benefits, and then flip ownership to a community organization who would buy the system at a discount from the original price, while providing a quick cash-out to the financial team.

[8] See website: https://www.mcecleanenergy.org/100-local-solar/
[9] See website: https://www.smud.org/en/Going-Green/Community-Solar
[10] See website: https://capitalandmain.com/realizing-the-promise-of-solar-for-south-los-angeles-0917

Example: East Bay Community Shared Solar Collaborative

The LDBP team has posited several options for an EBCE Community Shared Solar program, with one option built along the lines of the model structure noted above. Under this framework, EBCE could engage in an active role in the development of a shared solar project, and then sell the system to a third-party financier who would take advantage of tax benefits and, potentially, who would arrange the allocation of energy production in collaboration with EBCE. Production from the system would be allocated by percent "ownership" in the system, with bill credits potentially dispersed on a VDER basis, similar to a value that may be ascribed under a NEM-successor tariff.

Recommendations for EBCE Community Solar

Based upon our findings and discussions with EBCE staff and stakeholders, the LDBP team recommends that EBCE continue to evaluate how a multi-pronged strategy could address both the access problem and the ownership problem. A program with a similar structure to the LADWP LAANE program could help to open doors to solar production for customers who may not have opportunities to purchase solar systems for their homes. As slight variations of the various models, EBCE could enable on-bill financing of ownership shares or premiums, with credits similarly accruing to subscribers, or a third-party installer could own the system, with on-bill repayment of subscribers to the external program. At the same time, EBCE may consider using FIT incentives to spur market innovation for community solar programs and to attract non-profit and energy service partners willing to take on the program design and innovation risks needed to bring both ownership and access solutions to the service area. Finally, EBCE should look to equip community solar programs with energy storage features to expand their value as load shaping and shifting assets able to offset or supplement the activities of the portfolio manager NCPA.

Optony's experience in developing a community solar program for a municipal utility in Northern California (pending official roll-out) has provided some important lessons learned:

1. The premium pricing included in the Enhanced Market Access Model, as detailed above, can work to build an early subscriber group of environmentally-motivated energy consumers. As these early movers become community solar subscribers, less-motivated consumers may need to be offered short-term or long-term energy credits to be interested in subscribing. Many potential subscribers are only interested if there is a mid-term or long-term prospect of receiving credits on their utility bills from their "ownership shares".
2. Program design and communications must clearly specify what, exactly, is owned by subscribers, whether physical assets or energy produced, as well as ownership of associated Renewable Energy Certificates (RECs).

3. On-Bill Financing or Repayment can be effective in some cases, with a key stipulation that the arrangement is clear from the beginning and that adjustments to the familiar utility bill should be minimized.
4. The load-serving entity should allocate a dedicated percentage of solar production to customers with low incomes, with full or partial subsidies of any premium pricing affiliated with the energy. By acknowledging and addressing social equity issues, the program will gain essential community support.

Virtual Power Plant Aggregation and Regulatory Compliance

All of the recommended strategies and program features included in the LDBP have been evaluated within the context of building a network of distributed energy resources within EBCE's service area. The LDBP team anticipates that virtual power plant (VPP) aggregations are very likely within the five-year time horizon. When the value of a Local Portfolio of DERs either in the form of energy storage, PV, demand response, or energy efficiency assets are aggregated into a controllable virtual power plant, EBCE has the potential to reach regulatory compliance, meeting Renewable Portfolio Standards (RPS), energy storage mandates, and Resource Adequacy requirements.

It is notable that, to provide value as an asset able to meet regulatory standards, a virtual power plant would need to be equipped with smart features and controls and retain state of charge and on-off control within EBCE or its portfolio manager. For this reason, real-time data on energy usage and local generation should be tied directly to the dashboards, forecasts, risk management, and trading protocols of NCPA. While creating additional scope for the portfolio manager, establishing Standard Operating Practices (SOP) for linking local new generation to procurement can improve scheduling and procurement outcomes. Additional guidance on this topic can be found in the associated LDBP document.

A VPP aggregation also has the ability to drive policy and rulemaking internal to EBCE's practices and can act as the base load for meeting future Local Portfolio Standards (LPS), allowing EBCE to go above and beyond state requirements. The LDBP team recommends that setting any future goals and targets for a LPS should be tied to the costs of using local resources to create a clean/renewable energy mix versus procuring from large commercial projects, which may present a lower cost of energy in the near term. Siting projects and timing generation and supply services to create price advantage over wholesale prices become viable at around $50/mWh for local resources, a $10 savings over the average cost of wholesale electricity.

Conclusion

To fully plan to meet the community goals of EBCE, while simultaneously building the financial stability and credit that EBCE will need for long-term operations, the LDBP strategies will be implemented most effectively in close collaboration with the Integrated Resource Plan. Long-term and short-term wholesale procurement is well-advised to acknowledge potential demand reductions due to the projected success of EBCE initiatives.

After the finalization of the initial IRP, regular measurement and verification of program costs and results will lead to suggested adjustments to incentive levels in order to best achieve agency goals. EBCE can best meet its goals by considering a multi-pronged approach for incenting local DER development, with conservative budgeting in early years, developing into more ambitious projects as EBCE develops reserves and a credit rating.

The summary of recommended programs is:

- Enhanced Net Energy Metering: Include adders that incent CCE and stakeholder-desired results, such as low-income, public agency, and supply-shifting adders, as well as considering workforce adders through NEM or other procurement programs.
- Enhanced Feed-In Tariff offering: Similarly, include adders to incent desired project characteristics, while also featuring Market Responsive Pricing that ensures that EBCE does not over-pay for local solar production.
- Power Purchase Agreements: In any energy incentive contracts that EBCE executes with customers, including under a Feed-In Tariff, include a valuation mechanism for dispatching and providing value for discharged or stored energy on demand.
- Credit Enhancement and Risk Mitigation: Collaborate with partner public agencies, private third-parties, and investor-owned utilities to leverage their existing credit and tax equity, and to reduce out-of-pocket expenses for EBCE.
- Market Responsive Pricing: Following the recommendations in the Feed-In Tariff section of the LDBP, regularly monitor and track costs and benefits of implemented programs, making adjustments to speed up or slow down deployment to best meet procurement goals and existing contracts.
- Pay-for-Performance Contracting: Where market opportunities exist, explore opportunities for Pay-for-Performance contracts around such programs as Energy Efficiency and Demand Response, as detailed in other sections of the LDBP.
- Community Solar: Consider multiple options to incent local development of DERs that provide community benefits for a diverse array of customers. These can include an On-Bill Financing and/or On-Bill Repayment structure that opens financing options to

customers who many otherwise be restricted. The Community Solar programs will ideally track production and provide credits to subscribers at rates that come close to or, at some point, exceed premiums paid.

- Virtual Power Plant: In conjunction with Power Purchase Agreements, build dispatchability into all EBCE-owned and EBCE-incented programs. Make near-term plans for a future Virtual Power Plant that can address resource adequacy, congestion revenue rights opportunities, and energy storage requirements.

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About Optony

Optony Inc. is a global research and consulting services firm focused on enabling government and commercial organizations to bridge the gap between clean energy goals and real-world results. Optony's core services offer a systematic approach to planning, implementing, and managing commercial and utility-grade renewable power systems, while simultaneously navigating the dramatic and rapid changes in the solar industry; from emerging technologies and system designs to government incentives and private/public financing options. Leveraging our independence, domain expertise and unique market position, our clients are empowered to make informed decisions that reduce risk, optimize operations, and deliver the greatest long-term return on their solar investments. Based in Silicon Valley, Optony has offices in Santa Clara, Chicago, and Beijing.

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