California Energy Commission

CONSULTANT REPORT

Land Secured Finance Policy Framework Report

Prepared for: **California Energy Commission**
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California Energy Commission
Edmund G. Brown Jr., Governor

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ABSTRACT

The State of California has a goal of making all new residential construction zero net energy, which will require generation of renewable energy (primarily solar) to be associated with all new construction. The building code currently requires all renewable energy to be physically attached to the property they serve. Upcoming changes to the code for 2019 will allow the use of offsite, primarily community scale solar. Cost savings due to economies of scale make this a cost-effective way to meet the code requirements. This report studies the feasibility of land secured financing to provide funding for community scale solar power facilities. The creation of community facilities districts to fund infrastructure projects, using bonds backed by property in the district, and repaid by special tax levies, is well established in California, but the laws governing their use are not intended for funding the building of energy efficiency or renewable generation projects. The laws do allow the purchase of infrastructure, including solar facilities, using land secured bonds, which opens a pathway to funding community scale solar within existing laws using tax equity investors to fund the initial construction.

Keywords: California Energy Commission, ZNE, zero net energy, Community Solar, Land Secured Financing, Title 24, Community Facilities District,

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EXECUTIVE SUMMARY

Introduction

This report studies the feasibility of using land secured financing to fund the development of community scale solar facilities, in the context of new residential development. As the State of California moves towards the goal of having all new residential construction be zero net energy, renewable energy plays an increasingly important role in new developments. The current California building code only allows residential properties to be credited for solar generation when the system is directly attached to the house under consideration. The next update to the building code will allow credit to be given for systems that are not directly attached, provided the generation is verifiably dedicated to the house, and is a new resource. This opens the possibility of complying with the building code by using community scale solar facilities

Purpose

The purpose of this report is to analyze the benefits and potential disadvantages of community scale solar and provide a legal and policy framework to assist in the evaluation of how to use land secured financing to fund the development of community scale solar facilities associated with new residential developments.

To meet compliance with the upcoming 2019 California building energy code, new homes are required to generate as much electric energy from renewable sources, which in almost all cases is roof mounted solar photovoltaic, as the home consumes. The ability of any given home to meet this requirement will depend on multiple factors and may not always be possible. Changes to the building code in 2019 will permit the use of off-site renewable generation to meet compliance. In the context of a new development or sub-division, this will allow the required generating capacity to be aggregated into one or more community scale solar facilities. In addition to solving practical problems of installation, this will allow savings due to economies of scale: for example, a community scale solar facility for a small development of 75 houses would be approximately 43 percent cheaper than individual roof mounted systems.

The Energy Commission has considered several possible models for how new homes in a subdivision could comply with the building code using compliance using off-site solar, including:

- directly connecting solar panels from a nearby location to each house in the subdivision
- using the Green Tariff Shared Renewables Program
- building off site community scale solar facilities

For community scale facilities, either the developer could be responsible for the funding and building the facility, or a community facilities district could be established allowing the facility to be funded through a bond issue.

Retail energy suppliers can build their own facilities to generate solar power or purchase solar power on the open market to supply to their customers. This can allow the suppliers to meet the fraction of renewable power in their portfolio that is required by the Renewable Portfolio Standard[1], or to exceed it to meet demand for green power from their customers. These would not however satisfy the requirements of the upcoming building code, and so cannot be credited towards helping new buildings comply with the standards.

The creation of a community facilities district covering a new development effectively allows the financing of the required renewable energy facility to be transferred from the developer to the bond market. The bond payments are covered by a special tax on properties in the district and backed by a lien on the properties. The use of land secured financing creates the type of link between the renewable generation and the houses it serves that is envisioned by the upcoming changes to the 2019 building energy code.

The creation of community finance districts in California is primarily governed by the Mello-Roos Act of 1982. This act has been updated by subsequent legislation. The current law specifically prohibits the financing of energy efficiency improvements on private property for a new residential building. It does however allow the purchase of real property (such as a community scale solar facility) which has been constructed as if it been constructed under the supervision of the local agency. This allows the community facilities district to purchase solar facilities constructed by third parties. Construction by a third party allows the use of tax breaks which are only available to private sector builders, which can reduce the initial cost of the facility.

For the homeowners in the community facilities district to benefit from the facility that their tax payments are funding, a tariff needs to exist allowing a bill credit to be applied to the homes' utility bills to reflect their share of the generation. This would be a version of virtual net energy metering, whereby a home can be credited for generation which is not on the same meter as the home's load.

1 The Renewable Portfolio Standard requires all retail sellers of electricity to supply a fraction of their load from renewable sources. This fraction is currently 33%, rising to 50% by 2030

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Introduction

The purpose of this document is to analyze state and local policies supporting the use of land-secured financing to fund the procurement of solar electricity and storage for California's residential new construction market. The legal and policy considerations outlined in this document lay the foundation for a financial tool that can evaluate the proposed financing methodology within a variety of contexts[2].

The State's goal of achieving Zero Net Energy (ZNE) in all residential new construction is a key driver of policies to provide flexibility and tools for cost-effective approaches to ZNE at the building or community-scale. As such, a primary application of this land-secured financing tool is to support the development of energy resources for ZNE communities (residential subdivisions), which is the focus of this document. However, the relevance of this research and analysis is not limited to ZNE communities—or even necessarily limited to residential new construction.

As advanced energy generation and storage technologies make their way into homebuilding, there is a growing need for alternative methods to configure and finance these energy resources to maintain affordability and meet regulatory requirements. This research explores the use of land-secured municipal bonds to finance community-scale renewable energy generation and storage for new residential subdivisions. Finally, this research lays out scenarios in which land-secured finance can be used to enable residential communities to achieve ZNE.

2 The tool is available at www.znealliance.org

The Importance of Using Community Solar to Achieve Zero Net Energy

Introduction to Key Concepts

Land Secured Finance

Land Secured Financing (LSF) describes a process where capital for public infrastructure projects is raised by issuing municipal bonds secured by special taxes levied on real property. These bonds are issued by a special tax district, known as a Community Facilities District (CFD), a legal entity formed to cover a specific geographic area with the intent of collecting taxes to fund specific amenities needed within that area. A lien is placed on the properties in the CFD which is on parity with property taxes and senior to private mortgages, allowing the CFD to repossess the property if the taxes are not paid. Through this process, local governments can gain access to funding for a wide-range of costly infrastructure essential for growing communities that may otherwise not be available through general funds. Typical uses include streets, parking, lighting, landscaping, water, flood control, parks, open space, wetland restoration, schools and libraries. In addition, certain sections of state law governing land secured finance in California may allow for the use of land secured finance for energy infrastructure, as discussed in later sections of this report.

Community Shared Solar

A Community Shared Solar (CSS) facility is an array of photovoltaic (PV) solar panels that serve the energy needs of local neighborhoods through shared investment, ownership, and use at a scale that is larger than residential systems, and smaller than utility-scale solar systems. To date 16 states including California have enacted policies supporting CSS, and 101 projects have been successfully developed nationwide. A variety of CSS ownership models have been created, each responding to the policy frameworks in the states where the projects are implemented. In California, the primary option for CSS is a State legislated Investor Owned Utility (IOU) initiative called the Green Tariff Shared Renewables (GTSR). The GTSR program offers customers two options; the Green Tariff and the Enhanced Community Renewables (ECR). Through the Green Tariff, a customer can pay the difference between their current generation charge and a charge equivalent to procuring between 50% to 100% of solar generation. Under ECR, a utility customer purchases a share of a local solar project directly from a solar developer, and in exchange will receive a credit on their bill from their utility. In theory, the reduced revenue for utilities from bill credits can be offset by the avoided costs of investment in solar generation to fulfill the utility's Renewable Portfolio Standards

(RPS)[3]. Evaluating the effectiveness of the model in California is not possible at this time, since statewide no ECR projects have been completed.

Some publicly owned utilities and rural cooperatives have created and implemented their own functional CSS models as well. Despite the availability of these existing frameworks, success with enabling widespread adoption of CSS in California has been limited, with developer costs, limited credits for ratepayers, and complex enrollment requirements cited as some of the reasons.[4] The absence of a highly successful model for CSS in California provides an opportunity for innovation of the structure and financing which enable these developments.

Title 24

'Title 24' refers to a section of the California Code of Regulations that outlines building standards for residential and non-residential construction throughout the state. This section is subdivided into 12 parts covering various aspects of building design that are known colloquially as the "building codes". Part 6, California's Energy Code, is the part that contains the Building Energy Efficiency Standards (BEES) that require buildings to be constructed to standards that meet the State's goals for energy efficiency. In these standards, two possible paths are provided to show compliance with the code: a prescriptive path and a performance path. The prescriptive path requirements specify the performance requirements for each component of the building, such as wall insulation values or HVAC efficiency. In contrast, the performance path allows flexibility on the choice of individual components, provided that the overall energy use of the house, as modeled in approved software, is not higher than that of a similar house built using the prescriptive path requirements.

Community Choice Aggregation

A Community Choice Aggregator (CCA) is regional energy provider, typically managed by a local municipal government, that procures and sells electricity to residential and commercial customers. CCAs are relatively new organizations, emerging within the last decade as an option for local governments interested in taking on the energy procurement roles historically managed by California's IOUs.

A CCA differs from IOUs and from municipal owned utilities (MOUs) in that the CCA does not own the delivery infrastructure, but simply provides the electricity. Forming a CCA thus allows the local authority to control the source and cost of the power supplied, without the initial costs of buying or building a transmission and distribution system. Under the CCA model, IOUs continue to play a significant role in the interconnection and distribution of electricity and natural gas on the grid underlying a CCAs territory and are still entitled to compensation for those services. The IOUs are also involved in the billing process: collecting payment from the customer, retaining the

3 http://www.cpuc.ca.gov/General.aspx?id=12181
4 https://www.greentechmedia.com/articles/read/a-rough-start-possible-reforms-for-californias-community-solar-program#gs.WJ9SIoU

portion of the bill that relates to delivery and services, and passing on to the CCA the payment for the electricity supplied.

The roles and responsibilities of CCAs and IOUs are guided by California Public Utility Commission (CPUC) regulations, which also gives customers the option to "opt-out" of a CCA and resume purchasing electricity from an IOU, should they choose to do so.

CCAs are often focused on maximizing the use of clean and renewable electricity as part of their energy portfolio, though traditional fuel sources can still provide some of their power. To further the goal of de-carbonizing the electricity supply, many CCAs work with local governments to establish policies that encourage investment in distributed energy resource (DER) infrastructure, including both distributed and utility-scale energy generation and battery storage at the building or grid scale. Such is the case in the city of Lancaster, where the CCA (Lancaster Choice Energy) and the city collaborate on initiatives such as zero net energy (ZNE) mandates[5] and retention of city owned land for future energy development[6].

Benefits of Community Solar

Practical benefits

Currently in California the pathways to realizing community scale and district scale PV generation are limited. However, it is often difficult for a single home, multi-family structure or commercial building to support sufficient rooftop PV on-site to achieve ZNE. The ability of a single building to support enough rooftop PV to achieve ZNE is dependent on numerous factors including building orientation, available roof space, solar potential, climate zone, and system performance. Additionally, the utility must be willing to approve interconnection of systems sized to offset energy loads comprised of both gas and electric use, which causes the system to over generate from an electric utility standpoint. Generally, a utility will only allow the interconnection of a residential PV system which fits specific sizing guidelines: for retrofits, the PV system is limited to a size which will generate the same energy as was used by the house the previous year; for new build homes, the system size is limited to 2W/sq. ft. Given these constraints, the potential to generate sufficient renewable energy to offset usage of both gas and electricity on individual sites can be limited or cost prohibitive. Due to the above concerns, offsite or adjacent community-scale PV systems are being explored as a cost-effective way to supply the requisite renewables resources to reach ZNE. An additional benefit is that community solar lends itself very easily to a grid-friendly design, meaning battery storage can easily become a component of a community solar array and programmed for demand response events.

Cost benefit due to economies of scale

5 https://www.lancasterchoiceenergy.com/2017/10/12/1274/ accessed 1/25/2018
6 http://www.cityoflancasterca.org/home/showdocument?id=32456 accessed 1/25/2018

Allowing homes to achieve ZNE using community solar rather than rooftop allows homeowners to take advantage of the cost savings of scaled installations. When compared to rooftop solar mounted on individual houses, community solar takes advantage of the economy of scale, in that the cost per watt of the solar installation decreases with increasing size. While the costs of PV have been falling for several years both for residential roof mounted systems and larger scale ground mounted systems, the price differential between the two remains. To provide a comparison, the following example considers a development of 75 houses, each measuring 1700sqft, with a 3.4kW PV requirement. Table 1 shows the cost per watt DC for implementation of PV for various system sizes according to National Renewable Energy Laboratory (NREL)[7]. Since the proposed community-scale system is 255 kW, the estimated cost per watt was interpolated as the weighted average of the 200 kW and 500 kW systems.

Table 1: Cost per Watt DC PV

Size	$/Watt		
	2015	2016	2017
5kW residential	$3.19	$3.04	$2.90
200 kW community scale	$2.14	$2.12	$1.84
500 kW community scale	$2.12	$2.06	$1.77
255 kW (Interpolated)	**$2.14**	**$2.11**	**$1.83**

Source: NREL, ConSol analysis, 2018.

The estimated total cost for installing seventy-five (75) 3.4 kW systems (255 kW total) is $739,500, while the estimated total cost for a 255kW community scale system is $465,928, using the 2017 price per watt figures. The community scale system is thus 37 percent less expensive than implementing seventy-five (75) individual 3.4 kW systems.

The cost of solar has decreased over the last several years and is projected to continue to decrease in the future. Table 2 shows estimated PV prices in 2020 if they continue to decrease at current rates (average annual decrease from 2015 to 2017).

Table 2: Projected Cost per Watt DC PV in 2020

Size	Decrease per Year	Estimated Cost 2020
5kW residential	4.65%	$2.51
200 kW community scale	7.27%	$1.47
500 kW community scale	8.63%	$1.35
255 kW (Interpolated)	**7.52%**	**$1.45**

Source: NREL[7], ConSol analysis, 2018

7 https://www.nrel.gov/docs/fy15osti/64746.pdf; https://www.nrel.gov/docs/fy16osti/67142.pdf; https://www.nrel.gov/docs/fy17osti/68925.pdf accessed 1/25/2018

The estimated total cost for installing 75 3.4kW systems (255 kW total) is $ 640,987, while the estimated total cost for a 255kW community scale system is $368,538, using the projected 2020 price per watt figures. The community scale system is estimated to be 43 percent less expensive than implementing 75 individual 3.4 kW systems by 2020.

Title 24 Compliance

Prior to the 2016 code cycle, California's Title 24 BEES regulated only building efficiency; on-site renewable generation was not calculated or considered when demonstrating Title 24 compliance. With the advent of the 2016 BEES (effective January 1, 2017), builders were for the first time provided with the option to include renewable energy generation to offset a portion of annual building energy consumption. To meet current 2016 Title 24 BEES, homebuilders often choose this compliance option, and use rooftop PV as a performance-path compliance measure. For future code cycles, the use of solar is expected to become a requirement alongside building envelope improvements as state policymakers seek to achieve ZNE for all residential new construction—an objective stated in the CPUC's ZNE Residential Action Plan[8].

Per the California Energy Commission's working definition of ZNE, homes must be designed to meet or exceed an efficiency performance energy budget or "standard design budget", which is set by Title 24's mandatory and prescriptive measures. Once this target is reached, builders can integrate energy storage measures and on-site renewable energy generation to achieve an Energy Design Rating (EDR) of zero (0) using the Energy Commission's California Building Energy Code Compliance (CBECC-Res) software. Energy generation from a renewable source (typically through rooftop PV) is an integral part of reaching this "zero" EDR target.

Community Solar and Title 24

The current code requires that the renewable generation (solar) be on-site; however, draft versions of the 2019 code do allow for offsite solar to be credited. Language in the draft specifically addresses the possibility of using community solar and storage facilities to meet Title 24 requirements.

It states that:

"*A community shared solar system, other community shared renewable system, community shared battery storage system, or combination of the aforementioned systems (hereinafter referred to as a community shared solar or battery storage system) may be approved by the Commission as a partial or total offset of an onsite solar electric generation system and/or battery storage system that is otherwise required by Section 150.1(b)2 of Title 24, California Code of Regulations, Part 6. To be approved the*

8 www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5307 accessed 1/25/2018

community shared solar electric generation or community shared battery storage system shall meet the following requirements":[9]

The requirements are essentially that the solar facility shall be planned and permitted along with the houses it is serving, that the power provided shall be at least equal to the power that would be required for the individual houses to meet code, that the power be dedicated to the houses in question and may not be transferred to other buildings, and that the solar facility shall have a useful life of not less than 20 years.

The proposed code changes do not establish a preferred framework for financing or managing CSS. On August 22, 2017 the Energy Commission introduced four potential models that could be used to encourage the development of CSS in association with a new subdivision[10], and compared the attributes of these models with characteristics of on-site PV as described in the Commission's 2015 Integrated Energy Policy Report (IEPR). The models evaluated were:

a) PVs DC connected to home from other subdivision location
b) GTSR
c) Builder PVs at other location sharing bill savings with homes
d) Local Government CFDs

These approaches were identified in the Energy Commission's presentation as having potential compatibility with the attributes of the currently authorized on-site solar compliance model, as shown in Table **3** below. The dots represent matching attributes with onsite PV (green) and potential feasibility though not necessarily equivalence to on-site PV (yellow). The assignment of green or yellow values would depend on the model's ability to be: Additional, Dedicated, Durable, Temporal, Quantifiable, Verifiable, Beneficial to Home, Enforceable and Administratively Feasible.

9 http://docketpublic.energy.ca.gov/PublicDocuments/17-BSTD-01/TN221247_20170920T143237_Draft_2019_Standards_Part_1_Chapter_10.pdf, section 10-115a accessed 1/25/2018
10 Staff Workshop on Residential Solar Photovoltaic, Storage, the Energy Design Rating and Grid Integration Impacts, August 22nd 2017, California Energy Commission

Table 3: Models for Community Solar Facilities

	Additional	Dedicated	Durable	Temporal	Quantifiable	Verifiable	Benefit to homes	Enforceable	Administratively Feasible
Onsite PV	●	●	●	●	●	●	●	●	●
PVs dc connected to home from other subdivision location	●	●	●	●	●	●	●	●	● ●
Green Tariff Shared Renewables Program (GTSR)	●	●	●	●	●	●	● ●	●	●
Builder PVs at other location sharing bill savings with homes	● ●	● ●	● ●	●	● ●	● ●	● ●	● ●	● ●
Local Government Community Facilities District (CFD)	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●

Source: CEC Community Solar Presentation[11], Page 7

Of the four options considered, only the GTSR has multiple conflicts with the intent of the upcoming provisions in the 2019 Title 24 code for off-site renewables. The other three scenarios all appear initially feasible but present different challenges.

a. PVs DC connected to home from other subdivision location

This option would retain the direct one-to-one connection between the home and the generation but would move the PV off the rooftop onto either another building (one having surplus roof space) or onto the ground (such as vacant lots, roadside, or similar unused space within the development). This option would solve the problem of insufficient roof space sometimes found for multistory homes (where the ratio of roof area to floor area is lower than in single story homes) and removing the PV from the roof would have what some people consider an aesthetic benefit. However, it does nothing to lower the cost of an individual residential system – the additional wiring needed due to the increased separation between the PV and the home it serves would in fact increase the cost. There are additional administrative issues which would arise due to having a PV system owned (or leased) by one homeowner on the roof of a building owned by someone else (insurance and access for cleaning/maintenance for example).

c. Builder PVs at other location sharing bill savings with homes

This option would allow the developer to build (or contract someone to build) a community scale facility which would feed power into the local grid to be credited against the homeowners' utility bills. This model could be applicable whether the

11 http://docketpublic.energy.ca.gov/PublicDocuments/17-BSTD-01/TN220861_20170823T094322_82217_Community_Solar_Presentation.pdf accessed 1/31/2018

development is in an IOU territory or is served by a MOU or a CCA. For this model to work, it would be necessary for the builder or third party to finance the upfront cost of the solar facility, on top of the cost of the development itself. Financing considerations are covered in the section on Paths Forward

d. Local Government Community Finance Districts (CFDs)
In terms of infrastructure, this involves similar construction to option c. above, the primary difference being in the source of financing: the creation of the CFD allows the project to be funded using bonds issued by the local government, secured by a lien on the homes in the development, rather than obtained from conventional lenders. Administratively, the use of a CFD and LSF is better suited for areas under a CCA than an IOU, as discussed in the section on Tariffs

Table 4 below shows how the attributes were defined by the Energy Commission as part of their presentation on offsite solar models, and how they would relate to CFD financed solar facilities.

Table 4: CFD applicability to Energy Commission criteria

Attribute	Definition	CFD Considerations
Additional	New resource, not meeting other obligations	Solar is built in direct response to demands created by new housing development, as is typical of other forms of infrastructure financed using CFDs.
Dedicated	Provides benefits specific to home being permitted	Allows home being built to comply with Title 24 requirements through compliance credit for solar energy. The creation of the CFD in conjunction with the permitting of the new development ensures that the supply of energy is linked to the new homes
Durable	10+ year lifespan	Community scale solar projects have a lifespan exceeding 10 years.
Temporal	Generates Time Specific Power (TDV)	Solar is sized using CBECC modeling software which considers TDV.
Quantifiable	Modeled using CBECC-Res	The building energy use and the required solar sizing are both modeled using CBECC-Res.
Verifiable	Can be inspected to determine compliance	Utility-scale solar projects are often subject to monitoring and verification by permitting agencies. This same model can be applied to community scale DER and handled by the local government or subcontracted to a third-party.
Beneficial	Energy credits offset compliance costs	Under the City of Lancaster's current ZNE ordinance a 50 percent reduction in utility rates to consumers is available when builders select a mitigation fee option. A CFD model may be able to offer a similar reduction in utility rates. A separate cost-benefit analysis would be necessary.
Enforceable	Building Department can determine that installation follows normal permitting procedures	The permitting procedure for a solar facility would be independent of the method by which it is financed.
Feasible	Legally allowable	The Energy Commission is currently writing draft language to allow Title 24 compliance through the use of community solar facilities to provide required renewable generation for new homes

Source: ConSol analysis, 2018.

The intent of the Energy Commission's revision to the building code to allow the use of offsite solar for compliance is to retain a close proximity between generation and use of the renewable energy. Table 4 shows that a CFD-funded CSS facility could fulfill both the letter and the intent of the proposed code changes.

Solar Power Supply and Financing Options

IOUs, MOUs, and CCAs have the flexibility to provide renewable energy to customers without the source of the energy being directly connected to the buildings it is serving, for example by entering into a long-term Power Purchase Agreement (PPA) with a renewable energy developer. In this scenario the renewable energy development can be located at any distance from the community or buildings who will "purchase" the electricity. This is a viable way for a utility to increase the proportion of renewables in its portfolio but would not satisfy the requirements of the proposed changes to Title 24 for the 2019 code cycle, so solar energy supplied to newly-built houses this way could not be used for compliance with the building code. As seen in the previous section, the intent of the code changes is to encourage the development of local, community-based, CSS. In addition to the options discussed in the previous section, there are other possible paths that could be used to develop a CSS facility that would satisfy the code requirements, for example:

- A solar cooperative can be formed to build the CSS facility, with participating members being credited with their share of the generated energy.
- A CCA, IOU, or MOU can build (or commission) the facility and supply the power to its customers. Administratively, this would be harder to align with the code requirements, but ensuring that the power generated is dedicated to a specific home is not impossible
- A private third party can build a community scale facility and sell the power to the local CCA, IOU, or MOU. This would again be administratively challenging but not impossible.

While these are viable options, and are all possible under current law and codes, the link between the generated power and the homes using it is more tenuous than would be the case if a CFD were established to delineate the area paying for and served by a CSS facility. As the new code comes into force, the cost benefit of CSS over rooftop PV creates a natural incentive for new developments to pursue CSS facilities. The embeddedness of MOUs and CCAs in the local community, combined with the revenue raising ability of the local government, makes using local government bonds to fund CSS an interesting option.

Types of local government bond

Local government bonds can be divided into three categories for this purpose:

- General obligation bonds, which are payable from ad valorem taxes within the local government. Issuing these bonds requires approval by 2/3 of the votes in the local government jurisdiction. Using these bonds to fund community solar facilities which would benefit only a fraction of the homes within the jurisdiction would be unlikely to find support from 2/3 of the voters.
- Revenue bonds, which are backed by a specific revenue stream, such as the sale of solar power from a specific facility.

- Land secured bonds, which are backed by liens on properties within the CFD created to issue the bonds.

Of the three, the most suitable for financing CSS associated with a new development are land secured bonds. The formation of a CFD covering the new development, and the use of bonds backed by it to finance the CSS, creates the type of link between the generation of the solar and the houses that use it that is envisioned by the Energy Commission. Additionally, the creation of the CFD isolates the bonds from the local government's general fund, and the tax on property within the CFD (combined with the lien allowing the bond holders to repossess the property in the case of default) creates a predictable and relatively stable revenue stream for repayment. Despite the attractions of land secured financing for CSS, there are a number of legal and regulatory issues that must be addressed to create a viable path to use LSF to fund CSS.

Legal and regulatory concerns

The use of land secured financing in California dates back to at least 1887 when it was used to fund irrigation projects in the Central Valley. This section presents an introduction to current land secured financing laws and discusses their possible applicability to community solar projects.

Land secured financing solves a potential problem caused by California's policies as well as the innate timelines of developers. From a financial perspective, development presents a timing problem for developers and local governments: while the development (whether residential, commercial, or industrial), will usually lead to an increased tax base and hence increased tax revenues which will pay for the cost of providing services to the new development, the public improvements (streets, water, sewage, etc) associated with the development will typically need to be paid for in advance of the increase in revenue. In many states, local government can simply raise revenue, typically property taxes, to pay for improvements. In California, this is not an option since the passage of Proposition 13. Proposition 13 was a ballot initiative, passed in 1978, now included in the California State Constitution as Article 13A[12].

Proposition 13

Principally, Proposition 13:

12 https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&sectionNum=SECTION%201.&article=XIII%20A Accessed 1/24/2018

- Limited property tax rates to 1 percent of the assessed value of the property.
- Fixed assessed values at 1975/76 levels, with an allowed increase for inflation capped at 2 percent per year, re-assessable on transfer of ownership.
- Required special taxes to be approved by a 2/3 majority at an election.

After the proposition was passed, property taxes in California rapidly reached the limits set by the new law, limiting the ability of municipalities and local governments in California to funding infrastructure by raising across-the-board property taxes. The cap of 2 percent on annual increases is below the historical average inflation rate, effectively fixing the tax rate in real, inflation adjusted terms and closing off property taxes as a mechanism for raising revenue for infrastructure projects. As an alternative to raising taxes, public improvements can be financed by levying developer impact fees. These are however subject to the limitation that the total cost of the public improvements may be so large that they will need to be financed over a period of time and accessing sufficient credit on reasonable terms to fund the improvements presents challenges for the developer. Land secured financing can solve the potential problem caused by both this California state law and the timelines of developers, so in response to the inability of California municipalities to raise funds for infrastructure, the State of California adopted the Mello-Roos Community Facilities Act of 1982 ("Mello-Roos").

Mello-Roos Community Facilities Act of 1982 ("Mello-Roos")

Mello-Roos provides a mechanism for financing facilities and services through the use of special taxes within CFDs. It has been used to finance a wide variety of infrastructure projects in new residential development, as well as within existing communities. As written, the law does not allow the use of Mello-Roos districts to fund energy efficiency projects, and the complexities of this as well as proposed solutions are discussed in the following chapter. Mello-Roos authorized local governments and developers to sell tax-exempt bonds and collect revenue to fund public improvements. The revenue is in the form of a special tax or assessment which is applied to land or property, whether residential or commercial, within the defined geographic area of the CFD.

While Mello-Roos can be used to finance infrastructure for existing communities as well as new developments, this report focuses on new development. The stages for financing community facilities for a new development under Mello-Roos would normally involve the following steps:

1) A local government agency, typically acting at the request of the developer (either a single person/company or a small number of landowners) creates a CFD covering the development. Mello-Roos still requires the backing of 2/3 of electors in the district, but this requirement is simplified by creating the CFD when the only voters are the developer(s).

2) A lien is placed on all the parcels in the development and a special tax is levied on each parcel. Initially the tax burden falls entirely on the developer but is transferred to the homeowners as the development is built out and the houses are sold.
3) The government entity issues bonds to fund the improvements. Bonds can be issued in phases, or all once. The debt is serviced by using the tax payments from the property owners in the district. In the event that the tax is not paid, the property can be foreclosed on.

This mechanism has been widely used for infrastructure and would seem to be suitable for funding CSS. While the practical aspects of funding CSS this way would be similar to other infrastructure problems, there are a number of legal and administrative issues that would need to be resolved. These are discussed in the next section

Challenges in current policy context

Several legislative changes have been made to expand the scope of facilities eligible for Mello-Roos financing to include energy efficiency and renewable energy generation. State legislation in the form of Senate Bill 555 (Hancock, Chapter 493, Statutes of 2011) provided statutory authority for this in 2011. SB 555 allows CFDs to finance renewable energy, energy efficiency and water efficiency improvements on private property[13] by adding and amending language in sections of existing state codes pertaining to local government and CFDs.[14] The primary language enabling energy efficiency and renewable energy under SB 555 is as follows:

A district may also finance and refinance the acquisition, installation, and improvement of energy efficiency... and renewable energy improvements that are affixed, as specified in Section 660 of the Civil Code, to or on real property and in buildings, whether the real property or buildings are privately or publicly owned.

Allowing the financing of improvements fixed to "real property" (i.e., land and all structures on it as well as all other interests in the property, such as mineral rights) rather than specifically to buildings would allow the use of this financing mechanism for CSS generation.

Use for new construction

Language included in SB 555 indicates that the authority is geared toward enabling residential retrofitting rather than new building, with apparent limits to its application in new home construction:

This chapter <u>shall not be used</u> to finance installation of energy efficiency, water conservation, and renewable energy improvements on a privately-owned building or on

13 CA Stats 2011 Ch. 493
14 CA SB 555 Bill Detail https://www.billtrack50.com/BillDetail/7979b

privately-owned real property in connection with the initial construction of a residential building unless the initial construction is undertaken by the intended owner or occupant[15].

A possible loophole in the law exists if the buildings are constructed by a private party: if that party retains ownership of the building, and leases the units out rather than selling them, they remain the "intended owner" and the restriction may not apply. However, having the developer retain an ownership interest in the buildings has long term implications for issues such as resale, refinancing, or inheritance of the property. Therefore, while the law can potentially be interpreted to allow this ownership structure, it is unlikely that it would find much traction.

Paths forward

This section presents possible mechanisms and paths forward to permit the use of CFDs to finance CSS associated with a new development in a manner that would satisfy the Energy Commission's proposed changes to Title 24. Mechanisms exist within the existing laws to allow this, but amending the law is also a possibility.

Amendment to the law

SB555 specifically prohibits the use of CFDs to finance the construction of community solar generation on private land when linked to new construction. A change to §53313.5(l) eliminating this prohibition would allow the use of CFD to finance offsite solar for new residential developments irrespective of ownership structures. While this change would potentially simplify the process for funding CSS using LSF, the current tax incentives available to private builders of solar facilities suggest that the mechanism below, in which a private equity investor provides funding in return for the tax benefits, will remain the avenue that creates the most benefits for parties involved.

Initial third-party ownership

Notwithstanding the restrictions noted above, section 53313.5 states that: "A community facilities district may also finance the purchase, construction, expansion, improvement, or rehabilitation of any real or other tangible property with an estimated useful life of five years or longer or may finance planning and design work that is directly related to the purchase, construction, expansion, or rehabilitation of any real or tangible property. (…) A district may only finance the purchase of facilities whose construction has been completed, as determined by the legislative body, before the resolution of formation to establish the district is adopted pursuant to Section 53325.1, except that a district **may finance the purchase of facilities completed after the adoption of the resolution of formation if the facility was constructed as if it had**

15 Ca Government Code 53313.5(l)

been constructed under the direction and supervision, or under the authority of, the local agency that will own or operate the facility."[16]

This section allows for the CFD to be used to raise financing to fund the purchase of community solar facilities if the facilities are built by a third party "as if it had been constructed under the direction and supervision …of the local agency." Additionally, section 53313.5(g) allows that "tax revenues of a district may be used to make lease or debt service payments on any lease (or) lease-purchase contract". This allows for the following development model:

- In parallel with the establishment of the CFD as outlined above, a third party builds a solar facility to supply the new development covered by the CFD.
- The local agency leases the solar facility from the developer, using the tax receipts from the CFD to make both the lease payments and debt service payments for the bonds. The power generated is supplied to the homes in the CFD
- After a period of time (related to the funding of the facility – see section on Tax Equity investment below) the local agency purchases the facility from the developer. The tax revenue from the CFD can be used to pay debt service on the bonds and cover operating costs of the facility. Typically, the year of purchase and the purchase price are negotiated as part of the original lease or PPA contract.

This funding path allows the use of CFDs to secure low cost long term financing through LSF while maximizing the available tax benefits to reduce the initial costs of building the facility.

Tax equity investment

In the model above, the solar facility would initially be financed using commercial loans. The cost of the project can be significantly reduced through the use of tax equity financing which makes use of the investment tax credit (ITC)[17]. A tax equity investor in this case will finance some or all of the construction costs of the solar facility, and in return will benefit from the ITC and the accelerated depreciation allowed by law. Deals can be structured in many ways, but the common aspects are that the builder/long-term owner of the facility reduces their costs, and the tax equity investor reduces their tax liability.

16 Ca Government Code 53313.5

17 The ITC is currently 30%. Under current legislation it drops to 26% in 2020, 22% in 2021 and 10% thereafter

While the facility is owned by the tax equity investor and the third party, the power generated is supplied to the buildings in the CFD and is paid for using the tax revenues from the CFD. There is no need for the local government to issue bonds at this stage.

Transfer of ownership

Once the tax equity investor has benefited from the ITC and the accelerated depreciation, which takes place over five years, the ownership of the facility can be transferred to the local government. At this point the local government can issue the bonds backed by the tax on the parcels within the CFD and purchase the solar facility.

This mechanism for funding CSS using a combination of private funding to benefit from tax structures, followed by bond financing to bring ownership into the CFD, while not straightforward, provides a path to allow the use of CFDs and LSF to finance community scale solar facilities within existing laws and building codes. Funding the CSS facility this way imposes a tax on the properties within the CFD. This will only be viable if the homeowners in the CFD receive a guaranteed benefit in the form of a reduced electricity bill.

The use of a CFD to fund CSS facilities associated with a new development should be considered on a case by case basis. The advantages of secure financing, ease of compliance with building codes, and tax efficient funding need to be weighed against the possible disadvantages, which are likely to become relevant if the development runs into delays or fails to be completed. Until the lots are sold to the eventual homeowners, the tax burden falls on the developer or builder, which adds additional financial pressure in the event of delays.

Ensuring Homeowner Benefit

The assumption behind establishing a CFD and funding solar generation through a tax on the parcels therein is that the homeowners will benefit from the power generated. The homeowners are effectively substituting a tax for a portion of their utility bill. The power generated needs to be tied to the homes for two principal reasons:

First, the homes need to have benefits associated with the tax, otherwise they will suffer a loss of value in comparison to similar homes which are not similarly encumbered.

Second, while the draft language for the 2019 revision of the Title 24 requirements, allows the use of a community solar facility as "a partial or total offset of an onsite solar electric generation system and/or battery storage system that is otherwise required,"[18] it also requires that "the energy savings benefits shall be allocated from the total resource of the community shared solar electric generation system and/or community shared battery storage system in a manner *demonstrated to be directly correlated* to the energy performance specified by Section 10-115(a)2"(emphasis added). To fulfill the requirement and demonstrate this direct correlation, a tariff structure needs to exist that will allow the homes in the CFD to benefit clearly and directly from the solar generation. This requirement is to ensure that using community solar to fulfill the renewable compliance requirement results in additional local solar capacity being built and does not end up with the renewable energy being 'brought in' from distant sources.

Tariffs

California's regulated energy market places significant restrictions on energy generation, many of which limit the ways in which electricity can be shared between users. A key component of the LSF model for renewable energy is that the asset financed through tax assessment will be shared by the same group of users who are obligated to repay the cost for construction and maintenance. In the application of Mello-Roos for other forms of infrastructure—the construction of a city park to serve a new residential subdivision, for example—there is clearly a shared benefit (albeit not financial) for those who must repay the park construction and maintenance cost through annual property taxes.

In order for LSF of community-scale renewables to work, there must be a way to ensure that the residents who have been assessed a property tax receive an equal or greater financial benefit from the shared generation or energy-storage asset. In other words, the residents will need to receive a bill-credit from the electric utility that reduces their annual energy costs by an amount greater than the annual debt-service (tax assessment) for the renewable energy system, or it is unlikely that this tool will have broad appeal.

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18 Draft 2019 Standards Part 1 Chapter 10, California Energy Commission

In most of California, the CPUC sets rules (known as net-metering tariffs) for measuring "behind-the-meter" energy generation. These various net-metering tariffs apply to rooftop PV systems that function on a 1-to-1 basis on single family homes, as well as larger PV and storage systems that may be shared between a group of commercial buildings.

This section reviews existing tariffs in order to understand current limitations and to begin identifying what modifications might be needed in order for one or more LSF models to be widely deployed in California.

Net Energy Metering

Net Energy Metering (NEM) describes a tariff structure that enables customers who generate their own electricity (known as "customer-generators") to offset energy consumption with energy produced on-site, based on a one year period on a single, grid-connected utility meter. Under this arrangement, energy produced on-site can be credited toward energy consumed, reducing electricity bills for the customer generator. This is the tariff used by anyone in an IOU territory who has a rooftop residential PV system.

Currently, NEM tariffs are only available for systems using a single meter. For community solar, a more appropriate model would be the virtual NEM (V-NEM) tariff that is currently available in multi-family buildings.

Virtual Net Energy Metering (V-NEM) Variant

Virtual Net Metering (V-NEM) describes a billing procedure where utility customers can receive credit when their energy load and solar generation do not share the same meter. V-NEM has been available in California since 2012 through each of the State's IOUs, allowing multi-family buildings with rooftop solar to distribute proportional shares of credit for the renewable energy produced by the building.[19] Thirteen other states have V-NEM policies, each with different conditions on siting, ownership, capacity, and types of buildings eligible for the program. Since a distinguishing characteristic of CSS is that the solar system is not at the same location as the load of the project participants, V-NEM can be an ideal framework for developing a subscriber model for CSS in states where this is permissible.[20] Notable states using V-NEM policies as a basis for CSS programs include Connecticut and Maryland.[21] [22] Other states offering similar legislative

19 CPUC Decision 11-07-031 CSI Phase One Modifications http://www.cpuc.ca.gov/General.aspx?id=5408 accessed 1/25/2018

20 Chan, G., Evans,I., Grimley, M.,Ihde,B., Mazumder, P. Design choices and equity implications of community shared solar, The Electricity Journal, Volume 30, Issue 9, 2017.

21 State of Connecticut PUC Decision 13-08-14RE01

22 State of Maryland Senate Bill 398 (2015)

metering frameworks supporting CSS, though not explicitly using the term V-NEM, include Colorado, Delaware, Minnesota, Maine, Massachusetts, New Hampshire, and Vermont.

Compared to other states, California's V-NEM is one of the more restrictive frameworks, with the program limited to qualified customers of multi-tenant buildings that share a common service delivery point.[23] This restriction means that the State's existing V-NEM regulations have not served as a supportive template for CSS development in the State's IOU territory with the GTSR ECR program introduced to serve this purpose.

Tariffs for Community Choice Aggregators

The above tariffs were developed for, and apply to, IOUs, but CCAs are not subject to the same restrictions on tariffs as IOUs are and are at liberty to create essentially any tariff they believe serves their customers. As an effective branch of the local government, a CCA is also in a position to work closely with the government entity that owns the solar to ensure that the power generated is credited to the taxed homes. These factors create flexibility in developing new models supporting CSS, but at the same time mean that rates and credit for renewable generation are not regulated as is the case with IOUs under the CPUC's rules and therefore could be subject to adjustments at the discretion of the city.

A functional tariff framework for CCAs would also require that most homeowners opt to stay with the CCA over the long term. It is theoretically possible that a homeowner could opt out of the CCA and elect to receive power from the local IOU. However, given that residential energy costs are predicted to continue to rise[24] and that capital costs from the community solar would be locked in on a long-term purchase agreement through the CCA, it is unlikely that customers would benefit by opting-out. Should a customer within the CCA opt to receive power from the IOU, it would be necessary for the CCA to credit the IOU for that customer's share of the power generated by the community facility.

Division of generated power

The power generated by the community solar facility can be credited to the houses in the CFD in several ways: uniformly, where each house receives equal kWhs; by size, where each house receives a quantity of kWhs based on either square footage or deemed energy use; or by a time dependent valuation of the house's energy use, where each

23 Center for Sustainable Energy, CalSEIA, IREC Virtual Net Metering Policy Background and Tariff Summary Report, (2015)

24 US Energy Information Administration, Energy Outlook 2014-2040

house is credited with the same Time Dependent Valuation (TDV)[25] energy. Given the move to TDV within the California building code, this last measure would seem the most logical.

Conclusion

The increasing stringency of the California building codes, intended to further the State's goal of making all new construction ZNE, means that new homes will need to generate power as a matter of course. For the vast majority of new homes, this generation will be from solar PV. For new developments or subdivisions, CSS facilities can provide a cost-effective way to meet the requirements of the building code. The use of land secured financing to supply new developments with community based off-site solar power is feasible within the current laws governing community finance districts. A model where the facility is initially constructed by a private entity in order to maximize the use of tax-efficient financing, and then bought by the local government using bonds funded by a tax on properties in the development and secured by the homes, provides the most efficient method to achieve this.

25 Time Dependent Valuation is a tool to help determine the value of energy based on the time of use, as well as other factors such as climate. A kWh used during peak hours has a higher TDV than one used at off peak hours