THE PROMISES AND CHALLENGES OF COMMUNITY CHOICE AGGREGATION IN CALIFORNIA

Operational CCAs

Redwood Coast Energy Authority
MCE Clean Energy
(includes Napa County, parts of Contra Costa and Solano Counties)
Sonoma Clean Power
Lancaster Choice Energy
Clean Power San Francisco
Peninsula Clean Energy
(San Mateo County)
Silicon Valley Clean Energy
Apple Valley Choice Energy

2017 Launch

Alameda County
/ East Bay Community Energy
Los Angeles County
(Phase 1)
Yolo County - City of Davis
/ Valley Clean Energy Alliance

Exploring / In Process

Butte County
City of Hermosa Beach
City of Pico Rivera
City of San Jacinto
City of San Jose
Contra Costa County
Fresno County
Kings County
Mendocino County
Monterey County*
Placer County
Riverside County
San Benito County*
San Bernardino County
San Diego County
San Joaquin County
San Luis Obispo County**
Santa Barbara County**
Santa Cruz County*
Solano County
Tulare County
Ventura County**

*Monterey Bay Tri-County
**Central Coast Tri-County

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FOR INNOVATION

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DISCLAIMER

The UCLA Luskin Center for Innovation appreciates the contributions of the aforementioned individuals. This paper, however, does not necessarily reflect their views nor a full endorsement of its findings. Any errors are those of the authors. This report seeks to summarize many complex issues that affect electricity ratepayers. Given our desire to have this report be accessible to a lay audience, inevitably some details are omitted and others simplified. The scope of this report is to provide a brief overview of the different challenges encountered by community choice aggregators and investor-owned utilities, and not to provide a full analysis of the issues currently discussed in greater detail at the California Public Utilities Commission.

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EXECUTIVE SUMMARY

Community choice aggregators (CCAs) are a new type of retail electricity provider that enable communities to make decisions about what kinds of energy resources to invest in for themselves rather than relying on traditional investor-owned utilities (IOUs). Since 2010, California communities have established eight CCAs. Additionally, over a dozen communities are actively exploring the creation of a CCA.

In this report, we describe the opportunities and challenges facing CCAs and the implications for California more broadly, as summarized below.

Local Choice and Community Engagement.
CCAs are created by cities, counties, or joint powers authorities (made up of municipalities), which enable them to be more reflective of distinct community preferences than the regional IOUs. Community members have direct input into CCA decision-making through their boards of directors, typically comprised of local elected officials. Through their CCAs, these communities have so far revealed strong preferences for renewable energy. Some CCAs have specifically focused on developing local electricity generation from renewable energy. Compared to their affiliated IOU, CCAs offer larger incentives to households and businesses that generate solar energy (via net energy metering programs).

Environmental Benefits.
Thus far, all CCAs in operation in California generally offer a larger share of renewable energy than their affiliated IOU, up to 25 percentage points more. We estimate that these efforts resulted in emission reductions of approximately 590,000 metric tons of carbon dioxide (CO_2) equivalent in the past twelve months. With the statewide carbon market pricing a ton of carbon at $12.73 in 2016, this translates to $7.5 million in annual savings for electricity ratepayers. Through our analysis, we found that continued development of CCAs may enable California to surpass its 2020 renewable energy targets by up to four percentage points.

A More Competitive Retail Marketplace.
CCAs in California were the first retail electricity provider to offer their customers at least two options to purchase: a mixed energy portfolio with a high percentage of renewable energy or a 100 percent renewable energy option. CCAs have been able to offer greener energy at a very competitive price, sometimes at rates even lower than IOU rates. Most of the time, CCAs are able to provide lower rates for the same amount of renewable energy, compared to their affiliated IOU. The recent entrance of CCAs into the energy market allows them to benefit from a long decline of falling wholesale renewable energy costs. In contrast, IOUs have long been required by regulators to purchase renewable energy, including when it was far more expensive than it is today. This more competitive retail marketplace can only be beneficial for California's ratepayers, who will see a decrease in electricity rates and an increase in the amount of products they can choose from.

Past and Future System Costs.
Whether CCAs can remain cost-competitive with their incumbent IOUs depends on several policy decisions that could occur in the near future. The decision on how to allocate long-lived costs associated with IOUs complying with past public policies represents a challenge because there is a need to ensure fairness among both IOU and CCA customers. As more CCAs develop, more ratepayers across the state will be impacted by these policies. A clear distinction between each stakeholder's responsibilities is crucial in order to avoid unnecessary cost-shifting and artificially low rates. As an example, when a customer leaves an IOU to join a CCA, policymakers must decide how to appropriately allocate the ongoing legacy costs associated with that customer to the CCA, known as the *Power Charge Indifference Adjustment (PCIA)*. Originally, that decision-making was carried out between the IOU and the California Public Utilities Commission (CPUC) with little or no ability for CCAs to participate as they were inexistent.

A second set of policy decisions focus on how to allocate the costs of ensuring short- and long-term grid reliability to both CCAs and IOUs. These policy decisions involve Resource Adequacy and the Cost Allocation Mechanism, concepts that will be addressed in Chapter 4. A third set of policy decisions will determine how the cost of transmission and delivery should be allocated to energy generation depending on their need for transmission lines. While some CCA customers will be willing to pay more for cleaner power, community benefits, and the local control associated with CCAs, the ability of CCAs to retain more price-sensitive customers will be determined by how policymakers address these important questions.

This report seeks to summarize many complex issues that affect electricity customers. Given our desire for this report be accessible to a lay audience, inevitably some details are omitted and others simplified. The scope of this report is to provide a brief overview of the different challenges encountered by CCAs and IOUs, and not to provide a full analysis of the issues currently discussed in greater detail at the CPUC.

1
INTRODUCTION

The rapid emergence of community choice aggregators (CCAs) represents a transformative development within California's retail energy sector. CCAs allow cities or counties to aggregate the electrical loads of their residents, businesses, and municipal facilities to purchase energy on their behalf. CCAs have directly introduced competition into historically-protected investor-owned utility (IOUs) territories. In doing so, they have given eligible California customers the unprecedented choice of retail electricity providers.

By design, CCAs reflect their local community preferences and the institutional competency of their underlying governing counties and cities. Observers should not expect uniform policies or performance across all CCAs, as most of them are still at an early development stage. Yet current trends suggest CCAs are providing direct benefits to their own customers, as well as indirect benefits to all California electricity ratepayers through competition and innovations. To date, the five CCAs we reviewed have provided their customers with electricity generated from cleaner energy sources at lower costs and with greater responses to local conditions and needs.

Starting in this chapter, we describe the current retail energy landscape and the historical factors that have given rise to CCAs. We also provide an overview of the existing CCAs as well as those expecting to commence next year or are currently in the planning stages. In Chapter 2, we explain the legislation authorizing the creation of CCAs, procedurally how the California Public Utilities Commission (CPUC) approves the creation of CCAs, how they are governed, and most importantly, how their operational responsibilities differ from, but still depend upon, their affiliated IOUs.

In Chapter 3, we evaluate the performance of the five oldest CCAs and identify a number of benefits (quantified whenever possible). We evaluate the new renewable energy retail options they offer compared to those offered by their affiliated IOUs. We then explore the factors, both permanent and transitional, that have permitted CCAs to be cost effective. Broadening the focus, we evaluate how CCAs could help the state to more quickly achieve its renewable energy goals. Then, we qualitatively discuss additional potential benefits of CCAs.

Finally, in Chapter 4, we present the most important policy decisions that the CPUC and state legislature will have to make that will affect both CCA and IOU customers. When a customer leaves the IOU to join a CCA, policymakers must decide how to appropriately allocate the ongoing legacy costs associated with that customer. The fee charged to the customers to address this issue is known as the Power Charge Indifference Adjustment (PCIA). A second set of policy decisions focus on how to allocate the costs of ensuring short- and long-term grid reliability to CCAs or IOUs. These policy decisions involve Resource Adequacy (RA) and the Cost Allocation Mechanism (CAM). A third set of policy decisions will determine how the cost of delivery should be calculated depending on the actual need for transmission lines. While some CCA customers will be content to pay a slight premium for the cleaner power, community benefits, and local control associated with CCAs, the ability of CCAs to retain more price-sensitive customers will be determined by how policymakers address these important questions.

Historical Context for the Emergence of CCAs

Historically, IOUs and publicly-owned utilities provided electricity to the vast majority of consumers in California. The interaction between ratepayers and their affiliated utility was designed to provide mutual rights, obligations, and benefits established by a regulatory compact. However, several factors frayed some communities' trust and satisfaction with this compact, motivating them to seek alternatives to IOUs in the form of community choice aggregation. Beginning in the 1990s, and accelerated by the energy crisis of the early 2000s, California ratepayers in IOU territories became increasingly alarmed by rising electricity bills while experiencing a loss of trust in the performance (e.g., brownouts) and governance of IOUs. In the 1990s, the CPUC began planning for a transition to break up the vertically-integrated utility model. This resulted in the formation of the California Independent System Operator (CAISO) and the Power Exchange (PX) market, which enabled and supported greater competition in the wholesale market for electricity generation. IOUs were forced to divest their wholesale generating capacity. These developments reduced the technical and institutional barriers to giving ratepayers an alternative to the regulated monopoly IOU model.

In order to accelerate the process of providing more choice and efficiency, the state legislature passed Assembly Bill (AB) 117 in 2002, enabling the creation of CCAs. The law allows local governments and communities the opportunity to take a more active role in energy procurement policy and planning on behalf of their local residents and businesses. The bill also authorized default ratepayer enrollment in CCAs with the option to opt-out back to the IOU bundled service. Current CCA retention rates vary between 78 and 89 percent.[1]

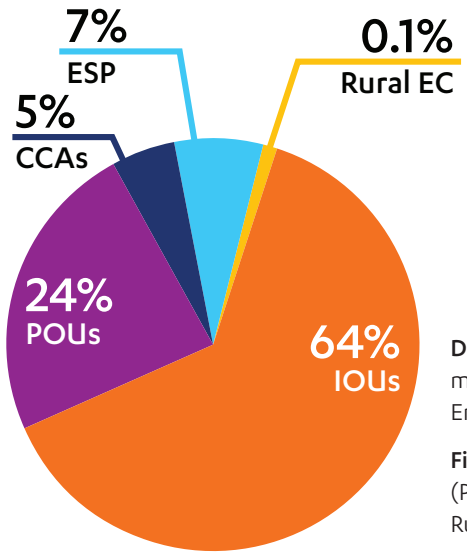
Current Retail Electricity Landscape in California

There are 81 electricity providers currently registered in California. However, only three investor-owned utilities deliver almost 63.6 percent of the electricity in the state and also own the majority of the electrical grid: Pacific Gas & Electric (PG&E) Company, Southern California Edison (SCE), and San Diego Gas & Electricity Company (SDG&E). CCAs, which by law may be created only in IOU territories, currently make up five percent of the market share. As shown in Figure 1, much of the remainder of the market is served by publicly-owned utilities (24%) and other electric service providers (7%).

The future growth rate of CCAs depends both on their organizational performance and the policy decisions discussed in Chapter 4. However, it is possible that within the coming years, CCAs could grow to represent the second largest type of retail energy provider in the state, surpassing publicly-owned utilities.

1 LEAN Energy US (2015). "The Potential for Community Choice Energy in the Heart of Silicon Valley."

Figure 1: Percentage of Electricity Delivered by Provider



Data Source: California Energy Commission data on 2012 Load Serving Entity Peak Loads GWh Requirements.

Figure Note: Publicly-Owned Utilities (POUs), Energy Service Provider (ESP), Rural Energy Community (Rural EC)

Current State of CCA Development

Eight operational CCAs have since emerged in California. In chronological order, they are:

- MCE (previously known as Marin Clean Energy), 2010
- Sonoma Clean Power (SCP), 2014
- Lancaster Choice Energy (LCE), 2015
- CleanPower San Francisco (CleanPowerSF), 2016
- Peninsula Clean Energy (PCE) in San Mateo County, 2016
- Apple Valley Choice Energy, 2017*
- Silicon Valley Clean Energy, 2017*
- Redwood Coast Energy Authority, 2017*

*These CCAs came into operation after the analysis for this study was completed. Thus, this study only focuses on the first five operational CCAs in California.

Other CCAs are targeted to launch later in 2017:[2]

- East Bay Community Energy in Alameda County
- Los Angeles Community Choice Energy
- Valley Clean Energy Alliance in Yolo County and the City of Davis

Additionally, another 20 CCA programs are being explored across the state, as illustrated in blue on Figure 2.[3] Note this Figure was created in May 2017. We recognize that change is happening rapidly and this map should be used to illustrate this point rather than provide an update on CCA development. The rapid increase in the development of CCAs indicates the strong interest in communities across the state to manage their own energy supply. This expansion of CCAs could result in a transformation of the energy generation and distribution industry in California.

2 LEAN Energy US. "California". (2016).
3 LEAN Energy US. "California". (2016).

Figure 2: Map of Existing and Potential Future CCAs in California

Operational CCAs

Redwood Coast Energy Authority
MCE Clean Energy
(includes Napa County, parts of Contra Costa and Solano Counties)
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Riverside County
San Benito County*
San Bernardino County
San Diego County
San Joaquin County
San Luis Obispo County**
Santa Barbara County**
Santa Cruz County*
Solano County
Tulare County
Ventura County**

*Monterey Bay Tri-County
**Central Coast Tri-County

Source: LEAN Energy US

2

ESTABLISHING CCAS AND HOW THEY WORK

The creation of CCAs is a relatively new phenomenon and process both in California and nationwide.[4] In this chapter we describe the state laws that authorized the creation of CCAs and bestowed specific responsibilities upon them and their affiliated IOU. Because both CCAs and IOUs compete for the same customers, and IOUs have a powerful incumbency position, we also review the state legislation and regulatory decisions that govern the conduct of each entity.

Although newly created CCAs assume the responsibility of purchasing energy on behalf of their customers, IOUs continue to provide other essential services such as electricity distribution, metering, and billing to CCA customers. We describe how this cooperative relationship between CCAs and IOUs is designed to work. Next, we describe the process by which cities and counties may propose the creation of CCAs and how CCAs are governed by local officials once they are created.

2.1 Policy Origins of CCAs and Their Relationship with IOUs

The authority to establish CCAs, including management of their ongoing fiscal responsibilities and regulatory obligations, was specified in Assembly Bill (AB) 117 in 2002. AB 117 was signed into law to give a city, county, group of cities, or group of counties the ability to aggregate the electrical loads of their residents, businesses, and municipal facilities. Under this state law, these aggregators can act as load serving entities for their communities, like any other utility or energy provider in California.[5] When a county or city decides to create or join a CCA, all customers within that jurisdiction are automatically enrolled in the CCA. However, customers can choose to opt-out and choose the incumbent utility for generation and delivery (bundled) service at any time. State law requires that customers receive a minimum of four enrollment notifications in the two months before and two months after a CCA program launches. IOUs are able to recover historic investment costs and other costs resulting from the loss of departing customers, which will be discussed further in Chapter 4.[6]

Once operational, community choice agencies have the procurement autonomy to facilitate the wholesale purchase and retail sale of electricity on behalf of their customers. IOUs continue to provide distribution and transmission grid services, as well as consolidated billing and other customer services to ratepayers as shown in Figure 3.[7,8] AB 117 also stipulates that CCAs cannot aggregate electricity loads that are served by publicly-owned utilities, such as the Sacramento Municipal Utility District or the Los Angeles Department of Water and Power.[9]

4 According to Lean Energy US, CCAs are statutorily enabled in California, Illinois, Ohio, Massachusetts, New Jersey, New York, and Rhode Island, with a handful of other states considering legislation. CCAs in California and Illinois are permitted to develop power projects as well as contract for power. Some states (e.g. Ohio) also allow for gas aggregation.

5 As articulated in the statute, the aim of a CCA is to "aggregate the electrical load of interested electricity consumers within its boundaries to reduce transaction costs to consumers, provide consumer protections, and leverage the negotiation of contracts."

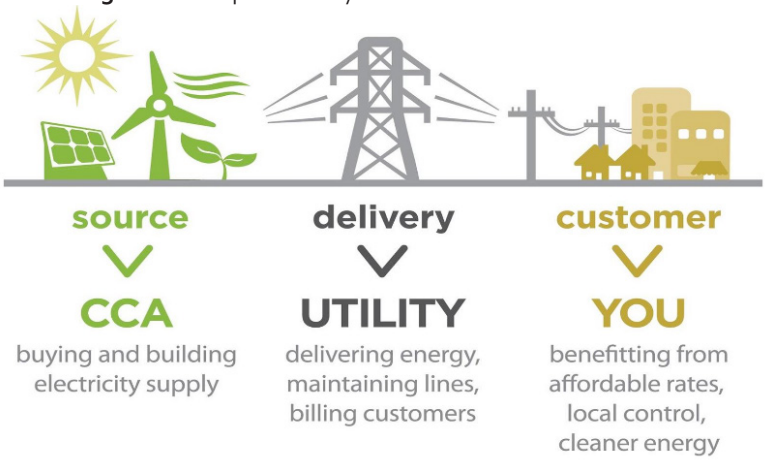
6 California Public Utilities Commission (2004). Decision 04-12-046.

7 California Public Utilities Commission (2003). Ruling 03-10-003.

8 AB 117 outlines the continued responsibilities of the IOUs. "All electrical corporations... shall include providing the entities with appropriate billing and electrical load data, including, but not limited to, data detailing electricity needs and patterns of usage... Electrical corporations shall continue to provide all metering, billing, collection, and customer service to retail customers that participate in community choice aggregation programs... Delivery services shall be provided at the same rates, terms and conditions as approved by the commission, for community choice aggregation customers."

9 Assembly Bill 117 (2001). Section 9604.

Figure 3: Cooperative System between IOUs and CCAs



Source: Nicholas Armour et al (2014). "Community Choice Aggregation in Torrance, a Pre-Feasibility Study." The University of Southern California Price School of Public Policy.

Table 1 below illustrates the collaborative system between IOUs and CCAs, noting the respective functions associated with each. CCAs assume exclusive responsibility for electricity generation, including purchasing electricity from generators, investing in their own generating resources, and balancing supply with demand. IOUs retain exclusive responsibility for CCA customers' electricity distribution, including grid infrastructure investment and energy delivery. IOUs are also responsible for CCA customers' billing and metering. The CCA can use its revenue to finance worthy public benefits programs such as installation of rooftop photovoltaic systems and energy efficiency investments. The CCA's knowledge of its community can help improve the effectiveness of investments by targeting programs that support community preferences. Current CPUC rules also allow CCAs the right to administer public goods funding for energy efficiency programs. Section 381.1 of the California Public Utilities Code allows CCAs to elect or apply to administer their own energy efficiency programs. If a CCA elects to administer programs, they are limited in ratepayer funds and only allowed to serve their own customers. When a CCA applies to administer programs, they are able to serve everyone in their service area regardless of whether they are a CCA or IOU customer.[10]

Table 1: How Responsibilities Are Shared between CCAs and IOUs

	CCAs	IOUs
Electricity Generation		
Purchasing electricity from suppliers	✓	
Balancing supply with demand	✓	
Electricity Distribution		
Grid infrastructure		✓
Delivering electricity to ratepayers		✓
Transaction		
Billing and Metering		✓
Communication	✓	✓
Integrated Demand Energy Resources		
Energy Efficiency Programs	✓	✓
Net Energy Metering Programs	✓	✓

Source: Table created by the Luskin Center for Innovation in May 2016.

10 California Public Utilities Commission (2014). Decision 14-01-033.

The Policy Framework for Managing Competition between CCAs and IOUs

Senate Bill (SB) 790, the Charles McGlashan Community Choice Aggregation Act,[11] directed the CPUC to establish a code of conduct to regulate IOU interactions with CCAs.[12] The CPUC subsequently implemented a number of new regulations, including the following:[13]

- A CCA Code of Conduct that defines and restricts marketing and lobbying activities that IOUs can conduct against CCAs and ensures equal treatment of CCAs by IOUs.
- Regular audits of the IOUs' compliance with the CCA Code of Conduct.
- The annual calculation and disclosure of a "neutral comparison" of the rates of an IOU and any CCA within its service area.

Other Major State Law Requirements

CCAs are also subject to other regulations applicable to Load Serving Entities, including, but not limited to: Resource Adequacy (RA) provisions, the Renewables Portfolio Standard (RPS), the Global Warming Solutions Act of 2006 (AB 32), and the Power Source Disclosure Program, administered by the California Energy Commission.

2.2 Regulatory Process of Becoming and Terminating a CCA

Cities and counties must follow a specific process in order to create a CCA, which ultimately must receive CPUC certification. Figure 4 below details the public process necessary to launch a CCA. Cities and counties initiate the CCA creation process by adopting an ordinance. Subsequently, they often conduct a feasibility study and are required to submit an implementation plan to the CPUC containing a variety of necessary components, including a statement of intent. The launch of a CCA frequently occurs in several phases by territory and customer category.

Figure 4: Regulatory Process for Establishing a CCA

CCAs are required to have sufficient funds to compensate ratepayers for IOU reentry fees, should a CCA need to terminate services. To date, no CCAs have terminated services in California. This possibility of service termination also raises questions about the role and responsibilities of IOUs as the legal "provider of last resort," highlighting a need to clarify how a provider of last resort would allocate costs and seek cost recovery. A related question is how any energy procurement contract liabilities associated with a terminated CCA would be allocated among local stakeholders. Currently, AB 117 requires CCAs to "post a bond or demonstrate insurance sufficient to cover the reentry fees."[14] The CPUC adopted an interim bond that is equivalent to the security deposit requirement that currently applies to an energy service provider's (ESP) registration with the CPUC, between $25,000 and $100,000, depending on the number of customers. According to some IOUs, this interim bond is insufficient to cover all costs required to ensure a rapid return of all customers in case of termination. This discussion is part of a recently launched proceeding at the CPUC.[15]

11 Senate Bill 790, Section 1. Charles McGlashan was a supervisor on the Marin County Board of Supervisors, and the founding chairman of MCE.
12 California Public Utilities Commission (2012). Decision 12-12-036: "Adopting a Code of Conduct and Enforcement Mechanisms Related to Utility Interactions With Community Choice Aggregators, Pursuant to Senate Bill 790."
13 Ibid.
14 Ibid. Page 2.
15 California Public Utilities Commission (2017). Ruling Setting Prehearing Conference. Rulemaking 03-10-003.

2.3 Governance Structure

CCAs are public agencies that are governed by a public board of directors, a city council, or a commission. Boards of directors are typically comprised of elected officials from each of the member communities, such as county chairs and vice chairs, mayors, and city or town council members and supervisors. Meetings are held on a regular basis to make administrative and policy decisions related to the operation of the CCA. CCAs can choose from three types of governance structures: a multi-jurisdictional joint powers authority, a single city or county enterprise fund, or third-party management.

A joint powers authority (JPA) serves as a public, not-for-profit agency on behalf of the municipalities that choose to participate in the CCA program. Under this legal structure, assets and liabilities of the CCA program remain separate from those of the county or city general funds. Surplus funds generated by the CCA may be reinvested back into the community in the form of new energy projects and programs within the entire service area, such as solar rebates for low-income households. Marin Clean Energy, Sonoma Clean Power, and Peninsula Clean Energy are joint powers authorities.

A second option is to establish a CCA through a single city or county enterprise fund. Under this governance structure, the CCA is managed by a single entity, as a separate program or fund within existing municipal operations. The financial liability has to be mitigated by specific vendor contract language that protects municipal assets. In some cases, the entity can be financially independent. Both Lancaster Choice Energy and CleanPowerSF chose this option.

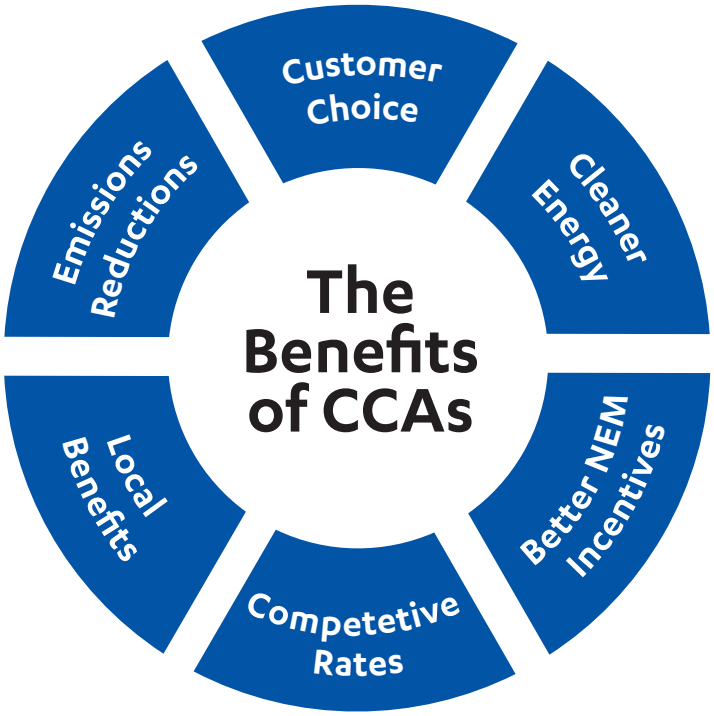
A third option involves commercial third-party management where the CCA's operations are delegated by contract to a private firm. This model has yet to be assessed because it has not yet been implemented in California.

3

POTENTIAL BENEFITS OF CCAS

CCAs have the potential to offer a variety of benefits to their customers, their region, and the State of California. In this chapter, we review the performance of CCAs along a variety of dimensions. We first assess the ratio of clean energy in the portfolios within CCAs compared with their affiliated IOU, revealing that CCAs provide larger amounts of renewable energy and produce lower amounts of greenhouse gases (GHGs) than their affiliated IOUs. Second, we compare costs of commensurate clean energy service options across CCAs and affiliated IOUs. Today, all CCAs provide their customers with competitive rates for a comparable or superior service. Third, and more broadly, the presence of CCAs also increases competition within IOU service territories, leading to greater consumer choice.

We also assess prospective benefits. This includes determining how much quicker the State of California may be able to achieve its ambitious renewable energy goals with the assistance of CCAs. This analysis is based on existing and soon to be launched CCAs. Finally, we assess the benefits that CCAs offer in terms of greater direct local democratic control and their ability to tailor policies to local conditions. As a result, CCAs appear to be positioned to address the local need for job creation, environmental justice, and more targeted education. Some CCA policies appear to offer additional environmental benefits through net energy metering compensation as well as offering ratepayers more options such as a 100 percent locally-produced renewable energy product.



3.1 Environmental Benefits of CCAs for Californians

Existing CCAs aim to supply larger quantities of renewable energy resulting in a greater reduction of criteria air pollutants and greenhouse gases emitted than their affiliated utilities. For this analysis, the Luskin Center for Innovation used the most up to date power content labels obtained from each utility. We also used the emission factors and the two percent transmission loss correction factor provided by the California Air Resources Board.[16] The use of Category 3 renewable energy certificates was also taken into consideration as it affects the actual greenhouse gas emissions for both MCE and Lancaster Choice Energy.

Figure 5 compares CCAs' and IOUs' power content labels and resulting greenhouse gas emissions. For example, we estimate that for the same amount of electricity delivered, MCE emits 26 percent less greenhouse gases than PG&E, due to a higher use of renewable energy. Sonoma Clean Power emits 61 percent less than PG&E, CleanPowerSF emits 30 percent less than PG&E, and Peninsula Clean Energy emits 53 percent less than PG&E. We also estimate that Lancaster Choice Energy emits one percent more greenhouse gases than SCE for the same amount of electricity delivered. Even though Lancaster Choice Energy displays a larger share of renewable energy than SCE, a substantial amount comes from Category 3 renewable energy certificates, also called unbundled renewable energy certificates.

Together, these efforts could have resulted in a total emissions reduction of approximately 590,000 metric tons of CO2 equivalent over the past 12 months.[17] With a metric ton of carbon priced at $12.73 by the statewide carbon market in 2016, this is more than 7.5 million dollars saved without requiring any conservation investment or consumption reductions from Californians.[18]

Reducing the use of fossil fuels in CCAs' power mix has a broader impact beyond CCA territories because electricity is often produced regionally. It may also disproportionally benefit low- and moderate-income households who generally live closer to natural gas power plants than wealthier households.

16 Greenhouse gas emissions estimations are based on the California Air Resources Board's reported emission factors for natural gas (0.61 MtCO2e/MMBTU), unspecified sources (0.428 MtCO2e/MWh), and geothermal (0.23 tCO2e/MWh).

17 With Peninsula Clean Energy being operational only for the last seven months.

18 California Air Resources Board (2016). Auctions of the California Cap-and-Trade program in 2016 were settled at the price of $12.73 per metric ton of CO2 equivalent.

Figure 5: Power Mixes for Each Load Serving Entity and Their Associated Reduction in Greenhouse Gas Emissions

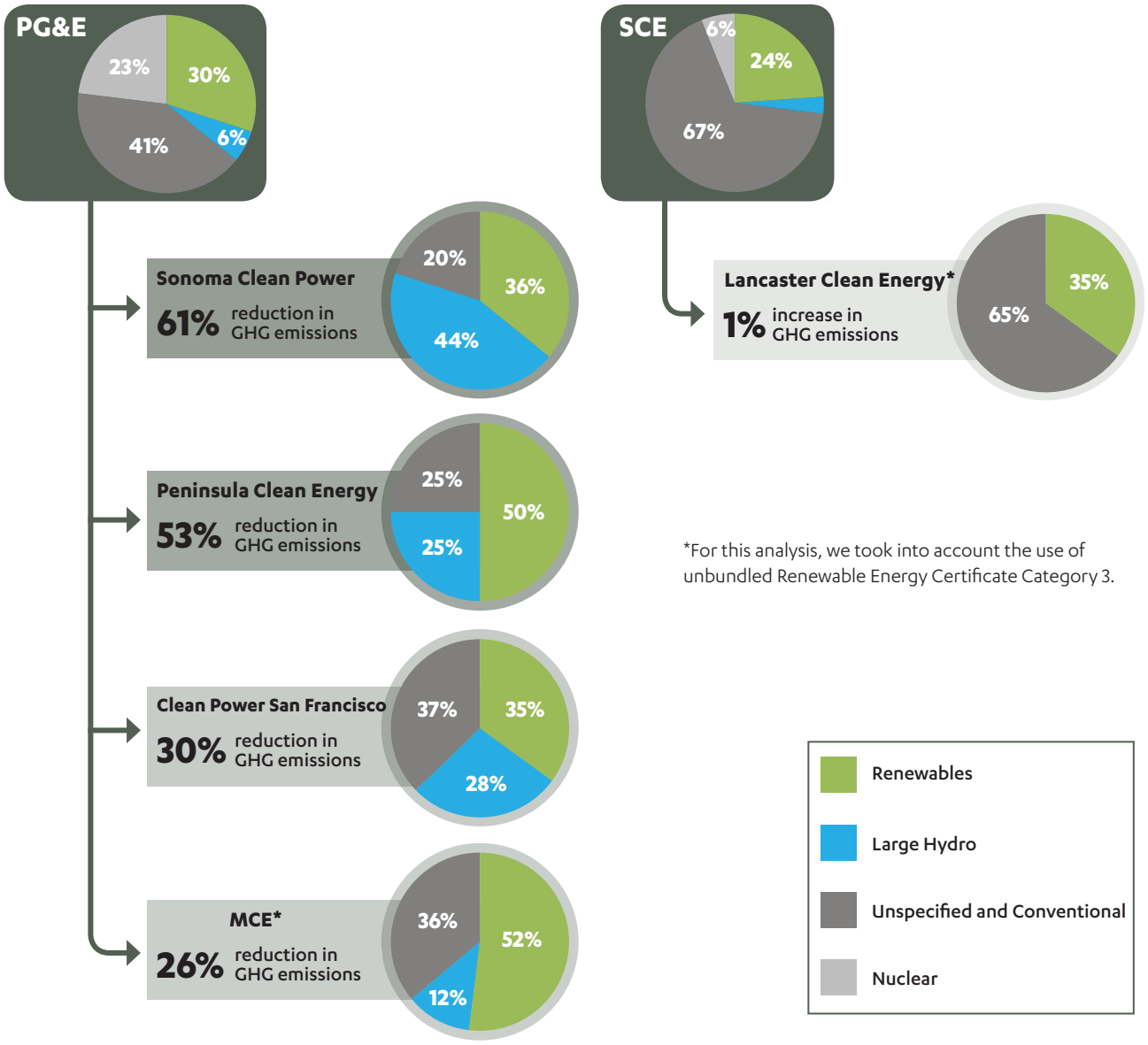


Figure created by the UCLA Luskin Center for Innovation in May 2017.

Source: Estimations based on data collected from California Air Resources Board, utility websites, integrated resource plans, implementation plans, and discussions with entities' representatives.

Figure note 1: Renewable energy sources include biomass and biowaste, geothermal, wind, small hydro, and solar. Large hydro power is not considered a renewable resource but rather a carbon free source of energy.

Figure note 2: For this estimation, the Luskin Center for Innovation did not take into consideration either greener tariff enrollment or net energy metering (NEM) customers due to data paucity for some of the energy providers. Greenhouse gas emissions were then calculated with the assumption that all customers enrolled into the cheaper products and no NEM generation.

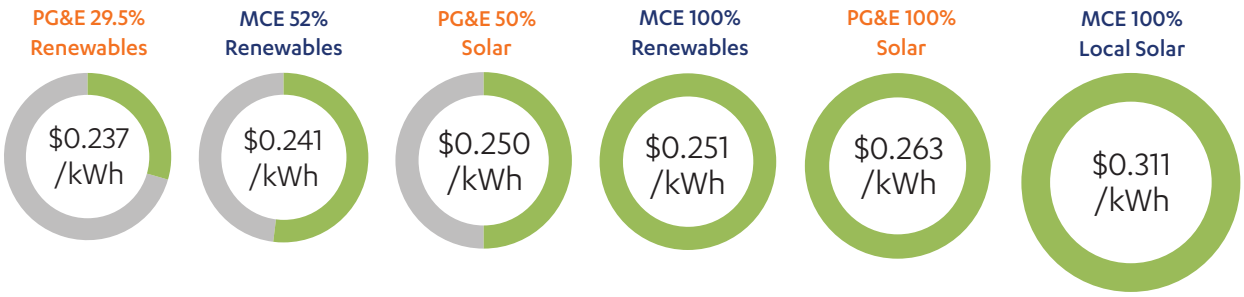
3.2 Financial Benefits for Ratepayers

3.2.1 Greener Electricity at Competitive Prices

Existing CCAs have provided the opportunity to their customers to receive greener electricity at competitive rates. This section presents a comparison of residential electricity rates amongst CCAs and their affiliated utilities. This analysis was conducted in February 2017 based on the "joint rate comparison" provided by IOUs and CCAs. The figures below show a snapshot in time of the comparison of each entity's residential rates (RES-1/E-1) based on monthly average electricity consumption. We find that most of the time, CCAs are even able to provide lower rates for the same amount of renewable energy, compared to their affiliated IOUs.

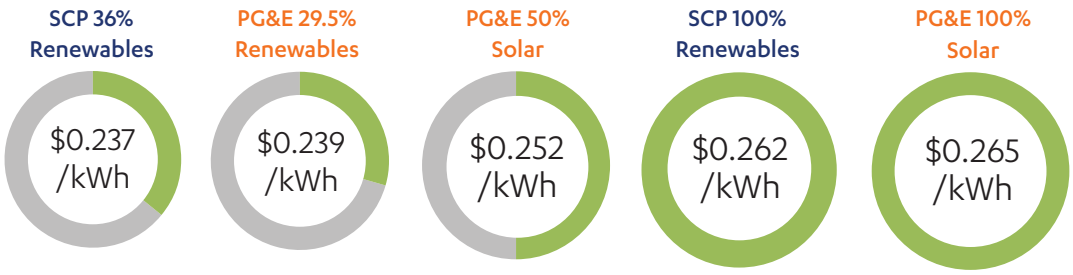
As illustrated below, all CCAs offer a slightly lower rate than their incumbent IOUs. However, the difference between each entity becomes greater when comparing their 50 or 100 percent renewable products. In this scenario, all CCAs offer significantly lower rates than their respective IOUs. We will review in the following sections the rate comparison, as well as the factors influencing this price difference between these entities.

Figure 6: Electric Rate Comparison between MCE and PG&E (Based on a Monthly Consumption of 463 kWh)



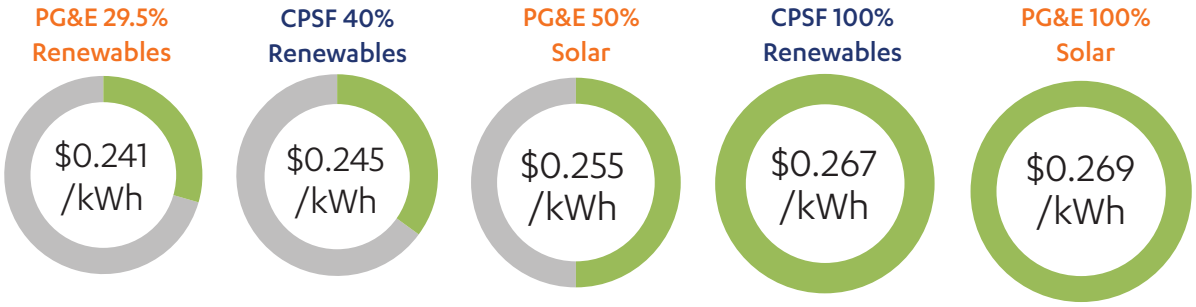
Source: Sample Residential Cost Comparison

Figure 7: Electric Rate Comparison between Sonoma Clean Power and PG&E (Based on a Monthly Consumption of 490 kWh)



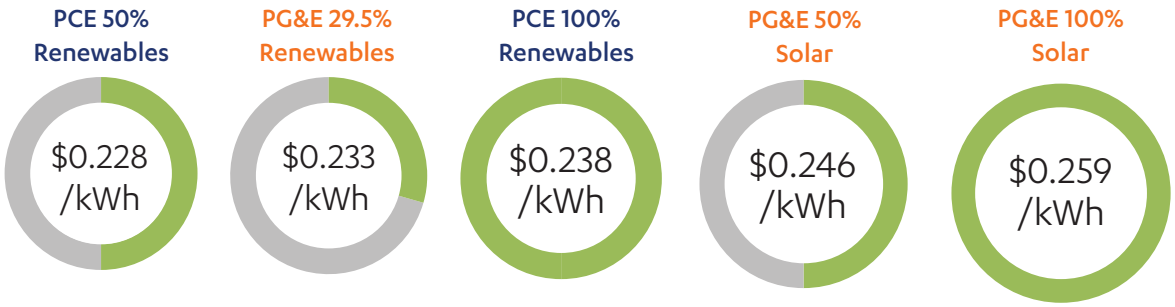
Source: PG&E-SCP Joint Rate Comparison

Figure 8: Electric Rate Comparison between CleanPowerSF and PG&E (Based on a Monthly Consumption of 287 kWh)



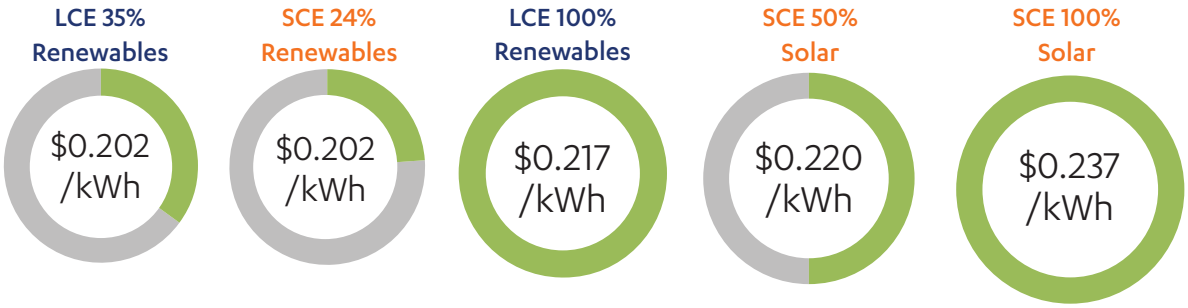
Source: PG&E-CPSF Joint Rate Comparison

Figure 9: Electric Rate Comparison between Peninsula Clean Energy and PG&E (Based on a Monthly Consumption of 417 kWh)



Source: Sample Residential Cost Comparison

Figure 10: Electric Rate Comparison between Lancaster Choice Energy and SCE (Based on a Monthly Consumption of 676 kWh)



Source: SCE-LCE Joint Rate Comparison

3.2.2 Factors that Affect the Relative Difference in Rates

There are several factors that explain how CCAs are able to provide substantially cheaper electric generation rates to their residential customers than the main IOUs.

Cheaper Renewable Energy and More Flexible Use of Power Purchase Agreements

CCAs have an inherent motivation to negotiate low-cost contracts for electricity generation in order to keep their customer retention rate high. This specific goal is partially made possible because the cost of renewable energy has decreased recently compared to when the renewables portfolio standard was first implemented in 2002. IOUs still have some old and expensive contracts in their energy portfolio. This drives up their total energy procurement costs, while CCAs can utilize less expensive renewable energy procurement contracts in order to compensate for the previously mentioned exit fees imposed on them.

The length and type of power purchase agreements can also play a role in price negotiations. Long-term power purchase agreements allow the construction of power plants, while short-term power purchase agreements are typically used for energy surplus purchases and can cost less. Newly created CCAs may utilize more short-term power purchase agreements than IOUs when sourcing their electricity generation to provide immediate transitional resources until they are able to invest in building local renewable projects; this may result in lower costs for immediate electricity procurement. Moreover, CCAs often start without credit history, making it harder for them to sign long-term contracts. Recognizing this, Senate Bill 350 (2015) stipulates that "beginning January 1, 2021, at least 65 percent of the procurement a retail seller counts toward the renewables portfolio standard requirement of each compliance period shall be from its contracts of 10 years or more in duration or in its ownership or ownership agreements for eligible renewable energy resources." However, this could impact the cost competitiveness of some CCAs due to their lack of credit history.

Not-for-Profit Organization

CCAs are not-for-profit entities. Although CCAs must borrow capital and adhere to financial obligations, they do not need to take into consideration shareholders' interests as their affiliated IOUs do.

On the transmission and distribution side, IOUs charge their rate of return to all ratepayers across California, regardless of whether or not they are CCA customers.[19] On the electricity generation side, both IOUs and CCAs directly pass through the cost of their power purchase agreements to their ratepayers. However, when CCAs build their own electricity generation facilities, they do not have to take into consideration shareholders' financial interests and a rate of return for the construction of these facilities, potentially resulting in a lower generation rate for their ratepayers.

Renewable Energy Certificates

The use of unbundled renewable energy certificates can also influence the cost of renewable energy generation. For renewables portfolio standard compliance purposes, each retail seller is allowed a maximum use of 15 percent Category 3 renewable energy certificates between 2014 and 2016 and 10 percent maximum between 2017 and 2020.[20]

19 The rate of return of an IOU is most of the time directly translated into the delivery rate through the transmission revenue requirement formula: RR = r (RB) + Operating Expenses + Depreciation & Amortization + Taxes. With r = overall rate of return and RB = Rate Base.

20 Renewable energy certificates are a tracking system designed to monitor renewable power production by providing documentation and ensure compliance with the renewables portfolio standard. The renewables portfolio standard delineates renewable energy certificates into three categories and places minimum and maximum allowable percentages for each. Renewable energy certificates can either be purchased from a provider along with the electricity or purchased separately from the electricity. Category 1 and 2 renewable energy certificates are delivered with the produced and underlying energy, known as bundled renewable energy certificates. Category 3 renewable energy certificates are considered unbundled as they are sold separately from the produced energy at a cheaper price, often to bring electricity produced from non-renewable resources into renewables portfolio standard compliance.

Due to the time needed to establish power purchase agreements of Category 1 or 2 renewable energy, some CCAs may go through transitions where they use Category 3 renewable energy certificates; most of the time, this happens when CCAs are first launched or when a CCA has a rapid expansion of their customer base.

According to discussions with each of the five existing entities, in 2016 CCAs used either no Category 3 renewable energy certificates or an amount in compliance with the renewables portfolio standard threshold. As an example, MCE's Integrated Resource Plan published in 2015 shows that they will use no more than 3 percent Category 3 renewable energy certificates in 2016 and moving forward. Lancaster Choice Energy uses up to 15 percent of Category 3 renewable energy certificates. However, according to Lancaster Choice Energy, this number will decrease over time as they increase their share of bundled renewable energy (Category 1 or 2 renewable energy certificates).

The state of California does not view Category 3 renewable energy certificates as an appropriate long-term solution to procuring renewable energy. According to data published by each entity, PG&E, SCE, Sonoma Clean Power, CleanPowerSF, and Peninsula Clean Energy do not use Category 3 renewable energy certificates in their energy procurement. According to their business plans and technical studies, Valley Clean Energy Alliance, Redwood Coast Energy Authority, and Los Angeles Community Choice Energy do not plan to use Category 3 renewable energy certificates.

3.2.3 Benefits to IOU Ratepayers

The expansion of CCAs has put pressure on IOUs to remain competitive in terms of rates and products offered. CCAs offer several options with different power content to their customers. Since the implementation of Senate Bill 43 in 2013, IOUs can also offer their bundled customers an energy option with a greener power mix through the Green Tariff Shared Renewables (GTSR) Program. As a result, the CPUC has recently permitted IOUs to offer 50 and 100 percent renewable energy options to their customers for a premium.

3.3 Benefits of Local Engagement

Customer Access to Decision-Making

CCA customers are offered a more accessible decision-making process compared to IOUs' ratepayers. Most decisions affecting the latter are often made by the CPUC. The CPUC Commissioners are appointed by the governor and oversee the regulation of very large service territories that contain heterogeneous communities. The CPUC decision-making process entails vetting by energy professionals but CPUC proceedings could be complex and difficult to follow for many ratepayers.

In contrast, CCAs focus on smaller territories and are overseen by democratically-elected local officials. This provides their ratepayers with enhanced local community participation in governance decisions.[21] It also helps CCAs respond more closely and rapidly to their ratepayers' preferences. Moreover, some CCAs have community advisory committees made up of volunteers with technical, legal, energy, or some other relevant experience who represent labor, commercial, industrial, residential, and other stakeholders.

Environmental Justice

By statute, all of the low-income and other public benefit programs available to bundled IOU customers are also available to community choice customers as those programs are funded on the delivery side of the bill. So, for starters, there is no step backward by choosing community choice.

Community choice agencies are uniquely positioned to initiate programs that offer both near- and longer-term relief to communities suffering from the impacts of fossil fuel extraction, fossil power generation, and end-use in transportation. The first CCAs have programs aimed to accelerate the electrification of transportation: MCE's SmartCharge program, SCP's Drive Evergreen, and LCE's engagement with BYD electric bus local manufacturing and charging. These measures have the potential to rapidly improve local air quality, as well as to address global climate emissions in the longer term.

By providing their customers with the ability to choose a greener product or a 100 percent renewable product at a cheaper tariff, CCAs create an opportunity to bring clean energy to Californians who do not have the financial capacity or the ability to install their own distributed generation resources. For example, renters are often unable to install solar panels on their roof and low-income households are unlikely to have the financial ability to invest in rooftop solar. Leveraging strong local preferences for clean energy, community knowledge, and flexibility to implement pilot programs based on best practices from around the country, CCAs offer many opportunities for innovation.

Like IOUs, CCAs provide programs tailored to low income ratepayers. As an example, MCE offers energy efficiency programs for low-income multi-family housing units and small commercial customers. To date, these programs have provided energy audits to 735 residential buildings and distributed $480,000 in rebates. MCE also provided 1,973 tenant units with lighting and water saving measures. MCE and CleanPowerSF both help provide low-income customers with access to solar installation by collaborating with GRID Alternatives and GoSolarSF.

21 All CCAs are subject to California's open meeting laws, including the Brown Act which requires transparency and public participation in Board Meetings; CCAs are also subject to the Public Records Act. Access to meetings and decisions allows for transparency and accountability in decisions that affect the public.

Local Education

Also like IOUs, CCAs invest in job training to develop their local workforce. MCE has sponsored multiple classes at the RichmondBUILD Academy, which trains local workers from underserved populations and low-income households. Many graduates of this academy will work on MCE's Solar One project, which has a 50 percent local hire requirement. Additionally, MCE provides technical and outreach trainings to Marin City Community Development Corporation and hires directly from that program for its energy efficiency program. Likewise, Lancaster Choice Energy works closely with various partners on clean energy education, including with the Lancaster School District.

3.4 Prospective Benefits of Developing CCAs in the Future

While some of the benefits described above can be identified and measured, some cannot yet be quantified with certainty as CCAs continue to emerge. First, by providing cleaner electricity at competitive rates, CCAs could contribute to reaching and even surpassing the state's environmental goals, including renewables portfolio standard and greenhouse gas reduction targets. Second, by aiming to generate electricity closer to where it is used, CCAs could improve their community's resiliency to natural disasters, spur their economy through local job creation, and avoid expensive transmission line expansions.

3.4.1 Exceeding the California Renewables Portfolio Standard

California's renewables portfolio standard requires every energy provider in the state to achieve 33 percent renewable energy procurement by 2020. More recently, Senate Bill 350 expanded the renewables portfolio standard requirement to 50 percent by 2030. Most CCAs have already achieved the 2020 target and aspire to surpass the 2030 requirement before that year.

The proliferation of CCAs will impact California's overall electricity power generation mix and market share of renewables. In light of the growth in CCAs, we analyzed this impact using data retrieved from the Energy Almanac 2015.[22]

To evaluate the impact of CCAs, we estimated two different scenarios for 2020. In each, we looked at load serving entities' specific targets for 2020. We assumed that all entities would achieve the 33 percent renewable energy target, unless specified otherwise.

In the first scenario, we assumed that no new CCAs would launch after 2017, capping the number of CCAs at 11. We used the CCAs' 2020 reported load forecasts and renewable energy targets. Even under this conservative estimation, CCAs' higher renewable energy procurement would result in California exceeding the renewables portfolio standard target by approximately two percentage points.[23]

In the second scenario, we assumed that CCAs would continue to develop across the state and would subsequently double the 2017 CCA electricity retail sales, in 2020. California could achieve 37 percent renewables, four percent beyond the RPS target. The additional four percent of renewable energy above the target would add approximately 10,000 GWh of clean electricity to the state grid

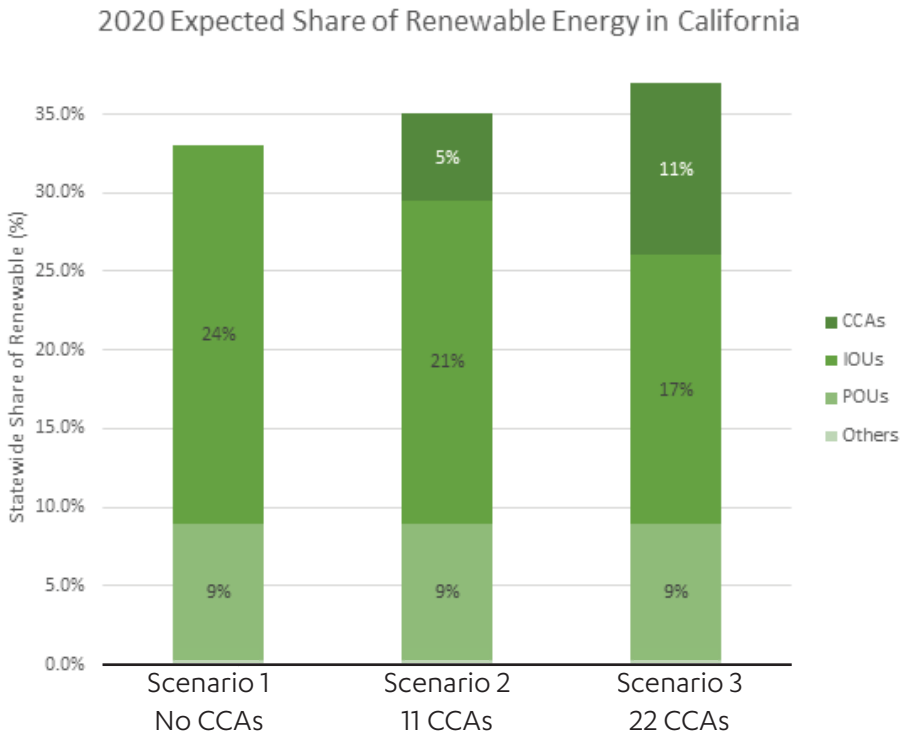
22 California Energy Commission (2016). Energy Almanac. "Electricity Consumption by Entity".

23 We retrieved information for the five operational CCAs and the CCAs that will launch in 2017: Silicon Valley Clean Energy, Redwood Community Energy, Valley Clean Energy Alliance, Town of Apple Valley, and Los Angeles Community Choice Energy. We used their 2020 target share of renewables and their forecasted energy requirements for 2020. These figures were subtracted from their affiliated utility's energy requirements.

in 2020. If this replaces 10,000 GWh of electricity generated by natural gas, approximately 5 million metric tons of CO2 equivalent emissions will be avoided.[24] Further development of CCAs and more aggressively deploying renewable energy would help Californians save more than $64 million in 2020, based on the anticipated Cap-and-Trade floor price in 2020.[25] Note that under such a scenario, the three main IOUs would see their market share decrease from 64 percent to 52 percent, and California would exceed its renewables portfolio standard target by approximately four percentage points. These assumptions align with the recent statements provided by PG&E and SDG&E during the CPUC's Community Choice Aggregation En Banc that took place on February 1st, 2017.

Figure 11 illustrates how the California power mix would surpass existing policy goals with these two scenarios.

Figure 11: Estimated Impact of CCAs Development on Statewide Share of Renewable Energy Used for Electricity Generation



Source: Table created by the UCLA Luskin Center for Innovation with data retrieved from the non-coincident load serving entity peak loads and total energy requirements from the California Energy Almanac (2014).

24 US Energy Information Administration (2016). "FAQs".

25 UCLA Luskin Center for Innovation (2016). "Protect the Most Vulnerable: A Financial Analysis of Cap-and-Trade's Impact on Households in Disadvantaged Communities". The anticipated trading price of carbon is $16/MtCO2 in 2020.

3.4.2 Toward More Local Energy Generation and Less Transmission Needs

When CCAs focus on developing local energy generation and distributed generation, they reduce reliance on long-distance transmission lines. Other benefits of doing so include potential reduction of peak loads, providing ancillary services such as reactive power and voltage support, improving power quality, and decreasing communities' vulnerability from potential catastrophic disruptions.[26] The development of local energy generation could also save costs by eliminating the need for transmission and distribution upgrades.

As illustrated in more detail in the following chapter, transmission revenue requirements have strongly increased since 2005. Rising transmission costs and potential future changes in the calculation of delivery fees might increase the structural incentives benefiting distributed generation. This, in addition to CCAs' mission statements, would push to prioritize local solar installations. In this context, CCAs may enjoy cost reductions for ratepayers as a result of procuring more distributed generation as IOU transmission tariff structures evolve.

In parallel, some stakeholders are questioning the current method used to estimate delivery fees and how it applies to energy providers. The California Independent System Operator will reopen an initiative considering potential market distortions around transmission cost allocation for distributed energy resources in 2017.[27]

As previously mentioned, MCE offers their ratepayers an option to receive 100 percent of their electricity from locally generated solar power. When customers enroll in this option, MCE is able to incentivize local distributed generation. Today the customers' decision to enroll in this option is generally based on environmental criteria or the desire to support local job creation. In the future, this decision could be driven by financial reasons resulting from a further drop in rooftop solar installation costs and increases in transmission charges.

As more CCAs are set to launch in the coming years, they could influence the future of energy procurement in California. For many reasons, it is challenging to quantify and compare energy procurement strategies between CCAs and their affiliated utilities. First, there are substantial differences in territory size. Second, CCAs have shown the desire to build their own electricity generation facilities to meet increasing demand load while IOUs face decreasing electric load. This gives CCAs the discretion to focus more on local energy generation and reduce their overall need for long-distance transmission lines. Moreover, there are important differences between CCAs, many of which are still at an early stage of their implementation. Hence, this section aims to describe the impact of the existing CCAs' energy procurement trends and goals. For this analysis, electricity generation sources will be considered local if they are within the CCA's service territory. The figures below present the electricity generation source locations for each entity and their affiliated utilities. We compare the local renewable generation capacity to the 2016 peak load demand in order to provide the reader with an order of magnitude. We acknowledge that this comparison does not reflect the reality of solar, which produces energy often before the actual peak load.

26 US Department of Energy and the Federal Energy Regulatory Commission (2007). "The Potential Benefits of Distributed Generation and Rate-Related Issues that May Impede their Expansion."

27 California ISO (2016). "Energy storage and distributed energy resources phase 2."

Figure 12: MCE, Sonoma Clean Power and PG&E Electricity Generation Sources

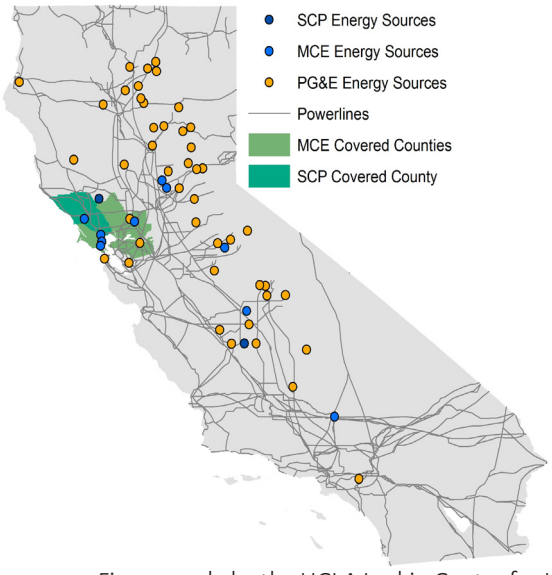


Figure 13: Lancaster Choice Energy and SCE Electricity Generation Sources

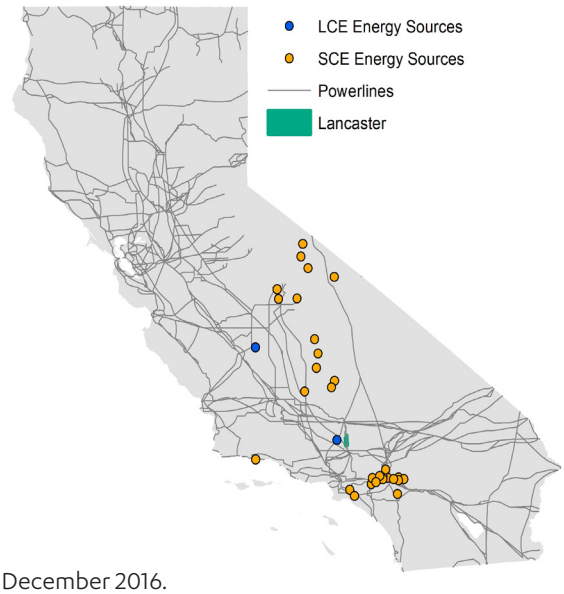


Figure made by the UCLA Luskin Center for Innovation in December 2016.

Source: MCE generation locations were retrieved from their 2015 Integrated Resource Plan. Sonoma Clean Power's generation locations were retrieved from their Implementation Plan. Lancaster Choice Energy's generation locations were obtained after discussion with their procurement team. PG&E and SCE's generation locations were retrieved from the California Energy Commission Energy Almanac.

According to recent discussions we had with MCE, they expect to have a total of 122.3 MW local renewable energy generation in the near future. Today, their Feed-in Tariff (FIT) currently has 3.2 MW of installed capacity, their net energy metering (NEM) program currently reaches 77 MW of solar capacity, and according to their most recent Integrated Resource Plan, they have 7.59 MW of local renewable power purchase agreements. As a reference, all of this combined represented up to 17 percent of MCE 2016 peak load demand.[28] MCE is also constructing its own solar energy generation facility. Once completed, MCE Solar One should provide an extra 10.5 MW capacity.

Sonoma Clean Power is further developing its local energy generation plan. They currently have 97 MW of installed capacity under their NEM program. They also signed a power purchase agreement for 30 MW of geothermal that will start in 2017, and their floating solar project is expected to provide another 9 MW by the end of 2017. As a reference, all of this combined should provide up to 29 percent of Sonoma Clean Power's peak load demand.[29]

Lancaster Choice Energy's NEM program currently has 21 MW of total installed capacity. Lancaster Choice Energy also has 10 MW of local solar power capacity.[30] As a reference, all this combined is providing up to 25 percent of their 2016 peak load demand.

In addition to focusing on local generation, CCAs are striving to spur local sustainable innovation. As an example, Sonoma Clean Power contracted with Pristine Sun to build the largest floating solar project in the United States and the second largest in the world: a 12.5 MW solar installation that will be located on water storage ponds and reduce evaporation. Also, in addition to electrifying transportation, Lancaster Mayor Parris and the City Council have passed an ordinance to move the city toward net-zero energy.

28 Estimation realized with information retrieved from MCE's Integrated Resource Plan – 2017 update and discussions we had with their staff.
29 Estimation based on discussion with Sonoma Clean Power and their 2016 peak load demand.
30 California Public Utilities Commission (2016). "2016 Renewables Portfolio Standard Procurement Plan of Lancaster Choice Energy".

Mechanisms in Place to Promote Local Distributed Energy Generation: Higher Net Energy Metering Incentives

CCAs tend to offer customers more advantageous NEM compensation than their affiliated IOU, although both of their respective customers are eligible for NEM programs when installing renewable generation facilities on-site. However, IOUs and CCAs compensate their NEM customers differently for any annual net surplus of energy generated. As Table 2 illustrates, in an effort to support local distributed energy resources, most CCAs offer higher financial incentives to their NEM customers.

PG&E and SCE pay the Net Surplus Compensation Rate, which is based on the energy consumed and generated, as well as the wholesale rate, which varies from month to month.[31] MCE and Sonoma Clean Power pay the net surplus of energy based on the retail rate the customer is enrolled in, plus $0.01/kWh. This past year, Sonoma Clean Power paid out almost $690,000 to NEM customers. Similarly, MCE offered $1,028,452 in cash outs to its NEM customers in 2015. Lancaster Choice Energy offers $0.06/kWh for any excess energy generated, which is currently twice as high as SCE's NEM compensation rate.

As long as a customer's on-site generation is greater than the usage, thus resulting in net energy surplus, a customer will generally receive greater incentives through a CCA's NEM program than an IOU's.

Table 2: Reimbursement Rate Comparison

Energy Provider	Reimbursement Rate
Marin Clean Energy NEM	Retail Rate + 1¢/kWh = 8.2¢/kWh
Sonoma Clean Power NetGreen	Retail Rate + 1¢/kWh = 7.9¢/kWh
Lancaster Choice Energy Personal Choice	Fixed Rate (6¢/kWh)
PG&E NEM	Wholesale Rate (2.72¢/kWh)
SCE NEM	Wholesale Rate (2.61¢/kWh)

Source: Table created by the UCLA Luskin Center for Innovation with information retrieved from each company's website.

3.4.3 Local Job Creation Resulting from Local Renewable Energy Generation

CCAs facilitate local job creation in a number of ways. Most prominently, CCAs have the opportunity to build their own electricity generation facilities and usually tend to do so within their territories. In addition, CCAs enter into agreements with third party energy providers to build new facilities locally. Focusing on local distributed renewable energy resources can result in local jobs in construction, installation, and maintenance. This could improve their local economy by reducing unemployment and improving household incomes. These benefits could become greater as CCAs keep investing in local energy resources.

31 California Assembly Bill 920 requires IOUs to pay customers for surplus electricity generated.

The UCLA Luskin Center for Innovation conducted an independent local job creation study in April 2016, based on information retrieved from each CCA's Integrated Resource Plan, Resource Summary and Guidance, or CPUC documents. We estimated job creation with the National Renewable Energy Laboratory Jobs and Economic Development Impact Models (JEDI Models). This analysis focused on local operations and maintenance (O&M) jobs and current local construction jobs. The following summarizes our findings by CCA.

MCE

MCE has created a significant number of jobs in the past years through approximately four local power purchase agreements, the development of MCE Solar One, and four FIT programs. As of April 2016, MCE has three local projects under construction:

- The Redwood Landfill, a biogas facility, has recently created 24 construction jobs and 16 local operations and maintenance jobs.
- MCE Solar One is estimated to create approximately 155 local full-time employment for construction and three local operations and maintenance jobs.
- Recently, MCE's six FIT programs in Cooley Quarry, Richmond, and Larkspur have cumulatively created 105 full-time employment jobs for the construction and installation of photovoltaic (PV) panels and two operations and maintenance jobs.

The remainder of MCE's local power purchase agreements are already constructed and currently supporting approximately 28.2 local operations and maintenance jobs.

Sonoma Clean Power

The Sonoma Clean Power Integrated Resource Plan indicates that four major power purchase agreements have been signed and initiated, or helped to initiate, the creation of several generation sources across the state. Of those contracts, two 10-year agreements were signed with a local energy company, Calpine ST, to provide up to 18 MW and 50 MW of energy and resource adequacy. Additionally, Sonoma Clean Power's 12.5 MW floating solar project in Sonoma County is expected to create approximately 185 construction and installation jobs and support operations and maintenance jobs locally.

CleanPower San Francisco

CleanPowerSF adopted a NEM program in 2016 that—in conjunction with San Francisco's GoSolarSF program, which provides payments to end use customers to support the installation of solar panels on their buildings—will create a number of local solar installation jobs. CleanPowerSF is also working on establishing a FIT program in 2017 to support the development of larger grid connected solar projects within San Francisco. In the long term, CleanPowerSF plans to build, own, operate, or contract with new renewable energy facilities to support the city's goal of achieving 100 percent greenhouse gas-free electricity supply by 2030. All of these initiatives will help create additional construction and operations and maintenance jobs in the region.

Lancaster Choice Energy

Lancaster Choice Energy's contract with Western Antelope Dry Ranch, LLC for the purchase of 10 MW of local renewable solar energy is expected to support 148 construction jobs and three operations and maintenance jobs.

4

KEY CHALLENGES TO FURTHER DEVELOPING CCAS

California is headed toward transformation with the rapid development of CCA programs across the state. Their proliferation could positively impact Californians should CCAs continue to provide competitive rates, ensuring high customer retention rates, while providing greener electricity. At the same time, their emergence presents some unresolved policy questions that state regulators must address.

One policy choice involves how to allocate long-lived costs associated with IOUs complying with past renewable energy policies to ensure fairness among both IOU and CCA ratepayers. A second set of policy choices involves how grid reliability costs are shared among IOUs and CCAs. Finally, a fair calculation of the transmission and distribution costs is essential to establish a level playing field for CCA and IOU customers.

As more CCAs expand, more ratepayers across the state will be impacted by how past, present, and future costs are shared across IOU and CCA customers. A clear distinction between each stakeholders' responsibilities is crucial in order to avoid unnecessary cost shifting and artificially low rates.

This chapter seeks to summarize many complex issues that affect ratepayers in California. Given our desire to have this report be accessible to a lay audience, inevitably some details are omitted and others simplified. The scope of this report is to provide a brief overview of the different challenges encountered by CCAs and IOUs, and not to provide a full analysis of the issues currently discussed in greater detail at the CPUC.

4.1 Ensuring Fair Shared Costs between Ratepayers: The Power Charge Indifference Adjustment

4.1.1 Background and Definition

In the past, several statutes have impacted the procurement decisions of IOUs. Assembly Bill 995, passed in 2000, and the renewables portfolio standard required the three main IOUs to invest millions of dollars every year in renewable energy from 2002 to 2012. Those investments occurred at a time when photovoltaic technology was still at an early stage and significantly more expensive than today. This stimulated the growth of renewable energy technologies in California, resulting in a drop in costs and a cleaner energy portfolio. The benefits and costs resulting from those policies should be shared amongst all Californian ratepayers. Moreover, in the current electricity market structure, and according to the Regulatory Compact, those legacy costs and obligations travel with the customer. The Power Charge Indifference Adjustment (PCIA) allows these costs to be shared between bundled and unbundled customers. Bundled service customers receive supply and delivery services solely from one IOU. Unbundled service customers receive supply from a load serving entity, such as CCAs, while receiving delivery services from the affiliated IOU. The PCIA is a charge assessed by IOUs to cover generation costs acquired prior to a customer's departure to another service provider. This non-bypassable charge is applied to all unbundled customers: CCA, Green Tariff Shared Renewables (GTSR), and direct access (DA) customers, in order to recover above market costs. Bundled customers include all of those who do not fall under these aforementioned categories and also share in these costs, except that the PCIA is embedded in their electricity rate and not broken

out as a separate charge on their electricity bill, as it is for unbundled customers. CCA customers benefit from lower generation rates because the price of natural gas and renewable energies is lower today than it used to be when IOUs signed older PPAs. Thus, IOU bundled customers pay a higher generation rate that includes the above market costs resulting from older power contracts that are still active in the IOU's portfolio. Moreover, IOUs are left with excess power that was purchased before some of their customers departed for a CCA. The PCIA addresses this excess power and estimates the price difference between the average portfolio cost of the utility and the current market value of electricity:

Indifference Amount = IOU Portfolio Costs - Market Value

The price difference is then charged to the customer per kWh. If the current energy price is below the average portfolio cost, the PCIA is positive and departing customers are billed every month for this. If the current energy price is above the portfolio costs, the PCIA is negative and CCA customers do not pay anything to the utility, but rather accumulate credits. Note that in this case, there is currently no option for a return of funds to the customers. However, if the cost of renewable energy keeps falling and the price of natural gas remains low, the PCIA is very likely to remain positive and unbundled customers will continue to pay the PCIA.

4.1.2 Impact on Ratepayers and Concerns amongst CCAs

The PCIA ensures that the remaining IOU ratepayers do not bear the costs of departing CCA customers. This is an important mechanism to protect customers who might not have the opportunity to choose their energy provider. However, the PCIA represents some risks for the future development of CCAs. As an example, MCE customers paid $13 million in PCIA fees in 2014, $19 million in 2015, and are expected to pay $43 million in 2016. According to those numbers, the PCIA represented approximately five percent of the overall electric bill in 2015 and up to 10 percent in 2016.

Unavoidable and Attributable

Assembly Bill 117 requires that energy contract costs are only recoverable through the PCIA if these costs are unavoidable and attributable to the customer.[32] To date, the CPUC has considered all contracts entered into by IOUs as both unavoidable and attributable, as no decision has prevented PCIA cost recovery at any time.

CCAs have contested whether these contracts are truly unavoidable, based on the fact that IOUs could anticipate more CCA departing customers and integrate the projected departing loads into their demand forecast. The CPUC has modified long-term procurement planning rules in 2014 in order to allow better communication between CCAs and IOUs: "The Commission has adopted an Open Season and Binding Notice of Intent (BNI) process to trigger the exclusion of potential CCA load from IOU bundled procurement".[33] However, some IOUs indicate that they have failed to receive these "Binding Notices of Intent" from CCAs.

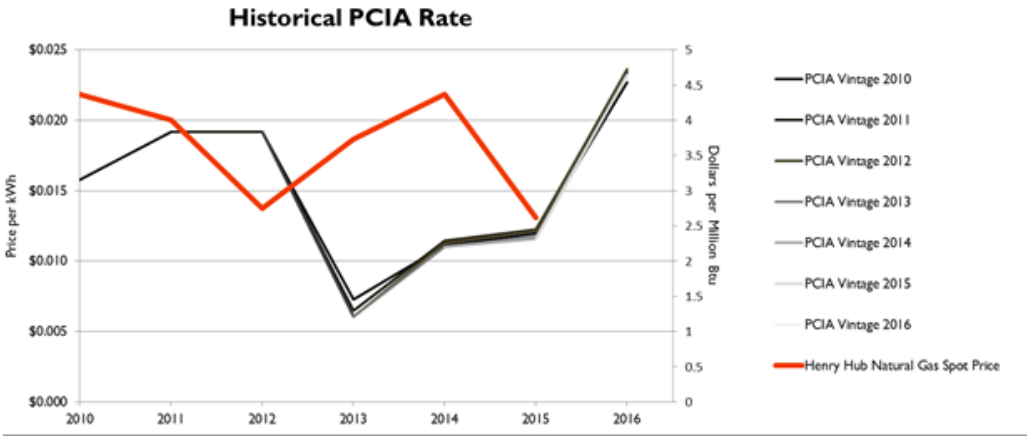
32 Public Utilities Code Section 366.2(f)(2) and California Public Utilities Commission (2004) Decision 04-12-046.

33 California Public Utilities Commission (2014). Decision 14-02-040: IOUs "shall estimate reasonable levels of expected Direct Access (DA) and Community Choice Aggregation (CCA) departing load over the 10-year term of the IOUs bundled plans, using information provided by the California Energy Commission and/or by a CCA in its Binding Notice of Intent. The IOUs shall then exclude this departing load from their future bundled procurement plans, and only procure for the assumed amounts of retained bundled load. Having been excluded from the bundled portfolio planning scenarios, the forecasted DA and CCA departing load shall not be subject to Power Cost Indifference Adjustment (PCIA) charges for any incremental stranded procurement costs incurred by the IOUs for the period after the date of departure assumed in their approved bundled plans."

Volatility

Figure 14 illustrates the volatility of the PCIA charged by PG&E over time. The PCIA decreased by 62 percent from 2012 to 2013 and increased by 211 percent in the three following years. These important price variations can be hard to explain to new CCA customers and could result in lower customer retention in the future. This instability and unpredictability presents a difficult and costly management challenge for CCAs.

Figure 14: Historical PCIA Rate Compared to Natural Gas Prices



Source: PCIA Rate Data from PG&E "Historical Rate Tables." Natural Gas Prices from Energy Information Administration. "Henry Hub Natural Gas Spot Price (Dollars per Million Btu)."

Transparency

The lack of transparency in the methodology of calculating the PCIA and in the energy portfolio of IOUs makes it difficult for CCAs to forecast the evolution of PCIA and integrate it into their energy procurement plan.

Treatment of Low-Income Customers

Some IOUs do not levy the PCIA to low-income customers, while others do, resulting in unequal treatment. In case the PCIA does keep increasing, it could become a more significant and disproportionate charge for low-income customers, as a percentage of their income.[34]

Communication

Although the PCIA is mitigated by a lower generation rate, CCAs have expressed concern that this charge might be hard to understand for most customers, resulting in some customers opting out.

4.1.3 Policy Discussion

As more CCAs launch, more ratepayers across the state will be impacted by the way these fees are calculated and billed. As stated by the Energy Procurement Vice President of SDG&E during the February 1st, 2017 "Community Choice Aggregation En Banc Hearing" organized by the CPUC, "67% of the load of SDG&E is looking at CCAs. All three IOUs could see up to 80 percent of the load departing across California."[35] This raises the importance of finding the fairest solution for both bundled and unbundled customers.

34 PG&E rate comparison vs. SCE rate comparison
35 California Public Utilities Commission (2017). "Community Choice Aggregation En Banc Hearing."

The PCIA is essential to ensure that the remaining customers do not bear the cost of departing customers. As such, the PCIA serves an important purpose for old and long-term contracts that were imposed by the state in the early 2000s.

However, the PCIA may make less sense for recent contracts that are voluntarily signed and undertaken by IOUs between the feasibility study and the launch of a CCA. The California Energy Commission (CEC), the CPUC, and the IOUs already work together in order to better forecast CCA activities in California as part of their long-term energy supply planning (also known as the Integrated Energy Policy Report).

Policymakers must better define when these contracts are truly "unavoidable and attributable to departing customers," as stated in the current legislation, and the role the prospective CCAs need to play in order to better incentivize all stakeholders. This could allow for a more predictable and stable PCIA that phases out over time.

Limiting the PCIA and ensuring an expiration date will also help to reduce inequality of treatment between CCA and other customers such as:

- Customers who depart one IOU service territory to move into another IOU service territory and do not get charged PCIA fees.
- Customers who move to a CCA's territory from out of state, but end up paying the PCIA fees, despite the fact that IOUs never had to procure energy on their behalf.
- Customers who leave a CCA to go back to the IOU and do not have to compensate the CCA for the excess power.

Finally, to address the misconception that only CCA customers pay these costs and improve transparency, we suggest evaluating the prospect of including a representation on bundled customer bills of the legacy above-market costs associated with older contracts for renewable energy. This way, both bundled and unbundled customers have access to information on these shared costs.

As of the finalization of this report, the CPUC is reviewing comments from both CCAs and IOUs regarding the recent PCIA Working Group and the proposal filed jointly by IOUs that offers to replace the PCIA with the Portfolio Allocation Methodology (PAM). The PAM would allocate the costs and benefits of utilities' power procurement portfolios among customers and would be calculated using "actual costs" rather than "above-market" costs.[36,37] The IOUs present PAM as being more "transparent, objective and fully consistent with California law".[38] However, CCAs have expressed concerns about the PAM proposal, including its valuation of mid- and long-term resources, and instead have proposed reforms to the PCIA to maintain indifference.[39]

36 California Public Utilities Commission (2017). "Southern California Edison Company's (U 338-E) Submission of the Final Report of the PCIA Working Group."
37 California Public Utilities Commission (2017). "Joint Application of SCE, PG&E, and SDG&E for Approval of the Portfolio Allocation Methodology for All Customers."
38 Ibid. Page 3.
39 California Community Choice Association (2017). "Ensuring Indifference and Prudent Procurement."

4.2 Ensuring Grid Reliability: Cost Allocation Mechanism and Resource Adequacy

The CPUC adopted two mechanisms to ensure both short- and long-term grid reliability: Resource Adequacy and the Cost Allocation Mechanism (CAM), respectively. This subsection explains how the division of responsibilities in energy capacity procurement may result in overlaps and double payments.

4.2.1 Definition

The CAM distributes capacity costs amongst the customer base when the IOU procures additional capacity. According to the CPUC, "it is a fixture of the Commission's Long Term Procurement policy and is based on the principle that the costs and benefits of new generation should be shared by all benefiting customers in an investor-owned utility's service territory."[40]

Resource adequacy rules require all load serving entities to demonstrate in both monthly and annual filings that they have purchased capacity commitments of no less than 115 percent.[41] Resource adequacy only looks at the year-ahead forecasted peak load and is related to short-term planning.

4.2.2 Impact on Ratepayers and Concerns amongst CCAs

While all load serving entities are responsible for resource adequacy, only IOUs are responsible for the procurement that necessitates the CAM. The costs resulting from the CAM are then passed on by the CPUC to CCAs. CCAs have raised concerns regarding the reallocation of energy capacity from the CPUC, which sometimes results in the overlap of these two mechanisms and a potential double payment of energy capacity. In some cases, a portion of the energy capacity allocated to CCAs through the CAM can then come as excess energy capacity and is hard to sell back in the market. Consequently, when this occurs, CCAs pay for an excess of capacity, which results in a waste of customers' resources. In addition, when IOUs purchase energy capacity and the CPUC reallocates a part of this capacity to CCAs, it does not take into consideration CCAs' customer preferences for greener electricity.

4.2.3 Policy Discussion

Due to its storied legislative history, the CAM "remains a contentious issue" throughout the regulatory community.[42,43,44] Some CCAs considered the CAM to be opaque and difficult to forecast. Consequently, the CPUC sought to address this problem by providing a monthly forecast of CAM allocations instead of a flat estimate for the year.[45] Moreover, the CPUC affirms that most information used in their CAM calculations is publicly available.

Senate Bill 350 established a provision for CCAs to self-provide renewable integration resources that otherwise would have been procured on their behalf by IOUs, and therefore subject to CAM. It is the CCAs' position that the CPUC could extend this option to all capacity resources in order to maximize CCAs' procurement autonomy in accordance with the Public Utilities Code 366.2(a)(5).

40 California Public Utilities Commission Policy and Planning Division (2014). "Cost Allocation Mechanism."
41 California Public Utilities Commission (2016). "Instructions for Newly Registered ESPs and CCAs."
42 California Public Utilities Commission Policy and Planning Division (2014). "Cost Allocation Mechanism."
43 California Public Utilities Commission (2006). Decision D.04-04-003, D.06-07-029, and D.13-02-015.
44 Senate Bill 695 (2009) and Senate Bill 790 (2011).
45 California Public Utilities Commission (2015). Decision D.15-06-063.

IOUs might lose a substantial amount of their procured electric load as more customers depart to CCAs, resulting in less appetite for new long-term energy procurement contracts. Initially, CCAs may encounter difficulties in issuing bonds or borrowing money due to their lack of credit history. For that same reason, some CCAs also mentioned difficulties signing long-term energy procurement contracts. Policymakers should therefore monitor these dynamics to ensure there is not a decrease in the amount of long-term energy procurement contracts in California.

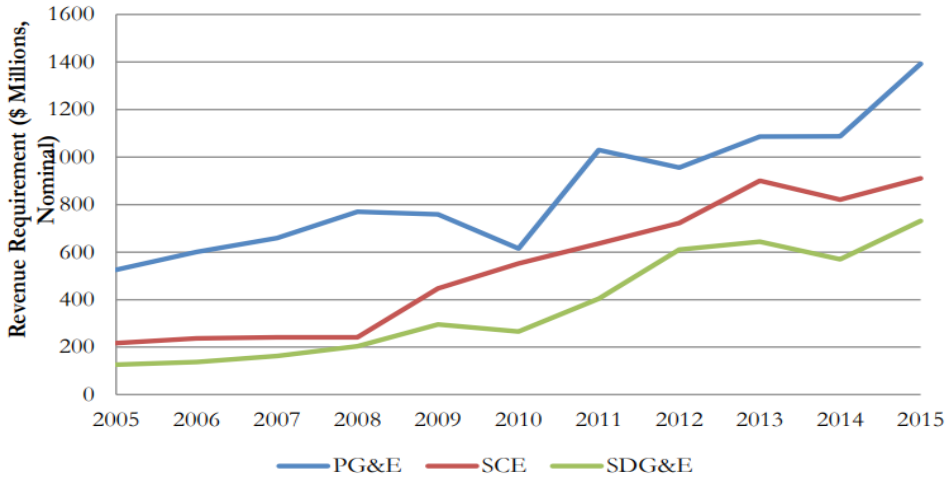
4.3 Assessing Transmission and Delivery Fees

Today in California, customers pay a fixed electricity delivery fee, calculated based on the amount of kWh consumed every month, regardless of its generation location. These fees do not take into consideration the type of infrastructure needed to deliver electricity from the energy source to the customer, including distance and high-voltage transmission lines. This means that the electricity consumed by a customer will be charged the same "delivery fees" no matter if it was generated by rooftop solar panels across the street or by a power plant outside of the state. Some stakeholders see this as a serious market distortion that represents an impediment to incentivizing locally produced electricity. As of May 2017, this issue regarding what are known as Transmission Access Charges, is being deliberated in the context of prospective legislation, Senate Bill 692.

4.3.1 Changes Occurring within Transmission and Distribution Services

With the proliferation of CCAs in California, the IOUs' business model is likely to change. For example, Los Angeles Community Choice Energy expects to deliver around 3,100 GWh per year, which roughly represents a third of SCE's annual electric load for residential and commercial customers. Consequently, we believe that this decrease in revenues might constrain IOUs to focus more on transmission and distribution services over time. Figure 15 illustrates how the three main IOUs have increased their transmission revenue requirements since 2005. In 10 years, SDG&E transmission revenue requirements increased by approximately 400 percent, while SCE increased by 350 percent, and PG&E increased by 150 percent.

Figure 15: Trends in Transmission Revenue Requirements for Each of the Three Main IOUs



Source: California Public Utilities Commission (2016). "Electric and Gas Utility Cost Report."

The CPUC reports that "these increases are driven primarily by CAISO [California Independent System Operator] reliability and RPS [renewables portfolio standard] mandates."[46] Cost increases were historically triggered by the additional need for transmission due to an increasing number of new power plants.[47] However, these recent increases in transmission revenue requirements can also be explained by the necessity of "replacing and modernizing aging infrastructure, interconnecting new electric generation, and compliance with updated North American Electric Reliability Corporation (NERC) requirements."[48]

4.3.2 Impact on Ratepayers and Concerns amongst Stakeholders

Today, delivery fees represent approximately half of a ratepayer's bill. In the future, those fees could take an even greater portion of the bill if the transmission revenue requirements keep increasing while renewable energy prices keep falling. Such a scenario could necessitate some policy changes regarding how transmission costs are distributed and borne by ratepayers, and whether or not a distinction between local sources and far away energy facilities needs to be taken into consideration when charging delivery fees.

This change would mean that distributed generation may become effectively cheaper than utility-scale installations built far away from cities. This could defer some grid upgrades and new transmission lines necessary to accommodate the construction of large renewable energy installations outside of urban areas. Moreover, this decision would strongly change the structural incentive toward local solar installations, which would benefit from lower delivery fees. Because CCAs generally focus on more local electricity generation, this may support CCAs and help them remain competitive.

46 California Public Utilities Commission (2016). "Electric and Gas Utility Cost Report." Page 18.
47 Ibid.
48 Ibid. Page 17.

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CONCLUSION

After decades of deregulation and policy efforts, electricity monopolies are going to be less dominant in California due to the increasing number of CCAs. This new type of retail electricity service provider enables communities to make their own decisions about their own energy investments rather than relying on traditional IOUs.

On average, CCAs in operation offer a larger share of renewable energy than their affiliated IOU, ranging from five to 25 percentage points more. We estimate these efforts have resulted in a total reduction of approximately 590,000 metric tons of carbon dioxide (CO2) equivalent in 2016, which is the equivalent of 7.5 million dollars in reductions at the carbon price of $12.73 on the statewide carbon market. Through our analysis, we found that continued development of CCAs may enable California to surpass its 2020 renewable energy targets by up to four percentage points.

CCAs have been able to offer greener energy at a competitive price, due to a more flexible and lighter cost structure compared to their affiliated IOU. Importantly, CCAs have entered the energy market relatively recently, allowing them to benefit from a long decline of falling wholesale renewable energy costs. Most CCAs offer larger incentives than their affiliated IOU to households and businesses who self-generate energy through rooftop solar (net metering programs). Most CCAs have made the commitment to develop local energy resources and directly own local solar facilities. Moreover, as the IOUs who serve more than two thirds of the state face increasing competition over the next few years from CCAs, we believe that ratepayers across California could benefit from having more choice.

The future of California's energy market will depend on many policy choices. Decision-makers should seek to ensure the development of CCAs while minimally impacting existing utilities and their ratepayers. A particularly important decision in the future will be how to allocate long-lived costs associated with IOUs complying with past public policies in order to ensure fairness for both IOU and CCA ratepayers. A clear distinction between each stakeholder's responsibilities is crucial in order to avoid unnecessary cost shifting to CCA customers. While some CCA customers will be willing to pay more for cleaner power, community benefits, and the local control associated with CCAs, the ability of CCAs to retain more price-sensitive customers will be determined by how policymakers address these important questions.

Research in the future could involve in-depth case studies of specific CCAs. This could inform how CCAs are evolving, their impact on ratepayers, and the factors that influence customer retention and loss. The framework created in this report could be built upon to further identify and then track progress on key metrics to assess CCA performances over time. As more areas of the state look to establish a CCA, it will also be important to inform issues of appropriate CCA size and scope. Finally, future research could address differences between the rules and regulations governing CCAs compared to IOUs and assess the implications of these differences.