Third-Party Review: City of Irvine Community Choice Energy Feasibility Study Findings

Prepared by:

MRW & Associates, LLC
1736 Franklin Street, Suite 700
Oakland, CA 94612

June 19, 2020

About MRW

This report was prepared by MRW & Associates LLC, led by Principal Mark Fulmer. MRW has provided energy consulting and rate forecasting services to California and other Western state agencies, cities, counties, businesses, trade organizations and consumer advocates since 1986. MRW has been working on Community Choice Aggregation (CCA) issues since they were authorized by the California State Legislature in 2002. MRW has prepared CCA Feasibility Studies for a coalition of Southern California Cities (2008), Alameda County (2015), Contra Costa County (2016), the City of Corona (2018) and the City of Long Beach (2019). MRW also prepared the Business Plan (2018) and Implementation Plan (2019) for what has become San Diego Community Power. MRW has also prepared peer reviews, of CCA Feasibility Studies (such as this one) and Risk Assessments for over a dozen jurisdictions considering forming or joining a CCA.

MRW staff, including Mr. Fulmer, were key witnesses at the California Public Utilities Commission in the proceeding that set the rules of conduct that govern the relationships between CCAs and their host utility. In addition, Mr. Fulmer has served as an expert witness before the Public Utilities Commission in every proceeding that has addressed the Power Charge Indifference Adjustment (PCIA) rate as well those that set the CCA financial security requirement and the fees that Southern California Edison can charge to CCAs for metering and billing services.

Contents

List of Acronyms

AB	Assembly Bill
ACV	California Redwood Coast – Humboldt County Airport
AER	Advanced Energy Rebuild
BEV	Battery Electric Vehicle
BTM	Behind-the-Meter
CAISO	California Independent System Operator
CalCCA	California Community Choice Association
CalChoice	California Clean Choice Energy Authority
CAM	Cost Allocation Mechanism
CCA	Community Choice Aggregation
CCE	Community Choice Energy
CEA	Clean Energy Alliance
CFO	Chief Financial Officer
CPA	Clean Power Alliance
CPUC	California Public Utilities Commission
DCE	Desert Community Energy
EBCE	East Bay Community Energy
ESP	Electric Service Provider
EV	Electric Vehicle
FIT	Feed-In-Tariff
GHG	Greenhouse Gas
GWh	Gigawatt hour
IOU	Investor Owned Utility
JPA	Joint Powers Authority
kWh	Kilowatt hour
LEAN	Local Energy Aggregation Network
MW	Megawatt
NEM	Net Energy Metering
PCIA	Power Charge Indifference Adjustment
PEV	Plug-in Electric Vehicle
PG&E	Pacific Gas and Electric
PHEV	Plug-in Hybrid Electric Vehicle
PPA	Power Purchase Agreement
PV	Photovoltaic
RA	Resource Adequacy
RCEA	Redwood Coast Energy Authority
RFP	Request for Proposal
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCE	Southern California Edison
SDCP	San Diego Community Power

Executive Summary

In December 2018 the City of Irvine (the City) commissioned EES Consulting to prepare a Community Choice Energy Feasibility Study and Technical Assessment (Study). The final version of the Study was completed in January 2020. In March 2020, the City requested MRW & Associates (MRW) to review the findings of the Study. This report is that requested review.

Herein, we present:

- the results of our evaluation of the Study's financial results and general findings
- the risks pertaining to regulatory changes, electricity market, and rate increases
- a review of three of the emerging technologies that could potentially disrupt Community Choice Energy program (CCE) operations
- a review of the CCE governance options featured in the Study
- a summary of lessons learned from other California CCE programs

Review of the Financial Analysis and General Findings

MRW found the Study's analytical approach to be sound and many of the variables used to be reasonable. However not all of the variables used are necessarily conservative.

One variable about which MRW has concerns is the assumed cost to comply with the State's Resource Adequacy (RA) requirements. The RA requirements set down by the State mandate that entities that serve load, like utilities and CCEs, procure sufficient capacity to meet their peak load with a 15% reserve margin. The prices used in the Study are about ½ of those currently being incurred for RA compliance. Increasing the Study's cost to comply with RA requirements by 50% would lower the CCE's projected net revenues (revenues minus expenses) from an average of approximately $16 million per year to $8 million per year. This adjustment does not impact the rate savings.

MRW Adjustment to Study's RA Costs

	January 2020 Final Study	MRW Adjustment
10-yr. Average Annual RA Cost	$15 million*	$23 million
10-yr. Average Annual Cost Difference		$8 million
10-yr. Average Annual Revenue	**$16 million**	**$8 million**
* This value does not explicitly appear in the Study; it was provided to MRW by EES.		

A second variable about which MRW has concerns is the Study's forecast of Southern California Edison (SCE) generation rates. The forecast of SCE's generation rates is important because it provides the benchmark against which the CCE program's costs are compared. If the CCE's

average costs are below the SCE generation rates,[1] then the CCE can offer its customers rates that are at or below SCE's; if the CCE's average costs are above SCE's generation rates, the CCE cannot offer lower rates. Based on SCE's current rate and the Study's assumed rate trends, MRW believes that the Study's forecast of SCE rates is about 1¢/kWh too high. Adjusting the Study's forecast of SCE retail generation rates to reflect this reduces the potential rate savings from 2% to about 0.5%. Per the table below, This equates to a reduction in annual average rate savings from approximately $7.7 million to $1.9 million and a reduction in annual City municipal utility account savings from approximately $112,000 to $28,000.

Impact of Adjustment to SCE Rates

	Per Study	SCE Rate Adjustment	Adjusted Value
Ave. Annual Cost Savings	$7.7 million	($5.8 million)	$1.9 million
Ave. Annual City Accounts Cost Savings	$112,000	($84,000)	$28,000

This range of CCE rate savings, 0.5% to 2.0%, is consistent with what current CCE programs are offering. Twelve of the 19 operating CCEs offer residential rate savings between 0.5% and 2%, five offer greater rate savings (albeit only one in SCE's territory) and one CCE offers no savings.[2]

The Study shows that the savings in the first years (2022-2025) are lower than the later years (2026-2030). Savings are expected to grow for CCE customers in the later years as SCE's generation rates, as explained by EES, increase due to the expiration of existing SCE contracts, additional load departure, and changes in wholesale power costs. These lower margins in the early years could create challenges in getting financing without Irvine or other Joint Powers Authority (JPA) members providing collateral to backstop the financing. For example, the experience of the most recent large CCE formed, San Diego Clean Power (SDCP), is instructive of what is currently required for CCE. Because of its projected narrow operating margin—which is similar to that shown in the Study—and general uncertainties facing CCAs, SDCP's finance provider required SDCP to have $5 million in collateral in order for it to provide a $5 million pre-launch loan plus a $35 million line of credit.[3] SDCP's collateral was provided by a San

[1] Net the Power Charge Indifference Amount (PCIA). The PCIA is a fee charged by utilities in California on entities or customers that choose to depart from bundled service of the utility and choose another provider of electricity generation service. The fee exists so that customers who purchase electricity (generation) from non-utility suppliers pay their share of generation costs acquired to serve them by the utility prior to their departure. The fee value differs based on the "vintage" or year the customer departed from service provided by the utility.

[2] CCEs offering savings between 0.5% and 2%: Apple Valley Choice Energy, San Jacinto Power, Clean Power Alliance, Lancaster Choice Energy, Desert Community Energy, Sonoma Clean Power, Silicon Valley Clean Energy, Marin Clean Energy, East Bay Community Energy, San Jose Clean Energy, Redwood Coast Energy Authority, Solana Energy Alliance. CCE's offering more than 2% savings: Pico Rivera (PRIME), Clean Power San Francisco, Monterey Bay Community Power, Rancho Mirage Energy Authority, Peninsula Clean Energy. CCE offering no savings: Valley Clean Energy Alliance.

[3] See, SDCP April 23, 2020 Board Packet, Staff Report on Item 4. (See html link on https://www.sdcommunitypower.org/board-meetings)

Diego-based philanthropic individual with interest in supporting local climate action, who had previously expressed interest in supporting SDCP.[4]

The Power Cost Indifference Adjustment (PCIA) is the single largest uncertainty in a CCE analysis. It can vary significantly from year to year, depending upon the wholesale power market, the costs of power. The data provided by EES shows that the assumed PCIA values are consistent with MRW's current PCIA forecast for SCE.

Beyond the detailed pro forma and risk analyses, the Study also considered the economic impacts that an Irvine CCE would have. The Study estimated that the CCE could generate $85 million in new economic activity and 85 new jobs. MRW finds these impacts to be reasonable to conservative. The Study used the industry standard macroeconomic input-output model, IMPLAN, to estimate the economic impact and new jobs based on the rate savings. To the extent the rate savings are less—or greater—than that shown in the study, the jobs impact would change proportionally.

The bottom line is that while the Study accurately shows that a CCE program in Irvine could be financially viable, there is still uncertainty in many of the inputs, particularly the SCE generation rate and the PCIA. No one can say precisely what the situation will be in 2022 and beyond; it could be more favorable than what is shown in the Study, or less. If Irvine moves forwards with a CCE formation in 2022, it should be prepared to defer launch if the variables are lining up poorly at that time. This is what Desert Community Energy did in 2018, when market prices spiked when it planned to launch. Rather than launching as planned and charging higher rates than SCE, the CCE chose to defer operations until 2020.

Financial Review Conclusions

- The Study's analytical approach is sound and most of the variables used are reasonable, albeit not necessarily conservative.
- MRW had concerns with two variables: The Study's cost to comply with Resource Adequacy requirements and its forecast of SCE retail generation rates. When MRW made high level adjustments to the results, the CCE continued to be financially feasible, albeit with tighter financial margins and lower rate savings: down to about 0.5% from the Study's 2%.
- The 0.5% (MRW) to 2% (Study) rate savings is consistent with what CCEs are currently achieving.
- Given current conditions, Irvine (or any jurisdictions with whom Irvine might form a JPA) will likely be called upon to provide collateral to backstop the CCE's financing.
- There is great uncertainty in many of the inputs, particularly the SCE Rate and the PCIA. No one can say precisely what the situation will be in 2022; it could be more favorable than what is shown in the Study, or less.

[4] *Ibid.*

Risk Assessment

The Study thoroughly addressed the financial and other risks a CCE faces, as well as how those risks could be mitigated. Many of the financial risks to a CCE—renewable prices, SCE rates, PCIA, and program participation rates—were addressed in the Study's sensitivity analyses. Others, such as regulatory risk beyond the PCIA, the Study discussed qualitatively.

The Study's sensitivity analyses varied the critical inputs to observe their impact on the CCE's financial position. The Study found that the CCE faces financial risk if its renewable power costs increase to the levels assumed in its "High Case" or if the CCE faces a PCIA that is higher than the forecast. Additionally, if SCE's rates are near the Low Case scenario, the CCE's average rate is at best comparable to SCE's and rate discounts may not be achievable.

The Study appropriately notes that these risks can be addressed and at least partially mitigated in a number of ways. First, they can be addressed by creating and maintaining rate stabilization fund. Once fully funded, this fund can be drawn upon so to allow the CCE to offer comparable or lower rates even when SCE's rates are lower than the CCE's average costs. Second, the CCE can manage its supply portfolio so that it is not exposed to unmanageable risks associated with variable power costs. Third, the CCE can monitor and actively participate at the California Public Utilities Commission (CPUC) on PCIA and rate and policy matters.

The Study did not address two important sensitivity variables: wholesale power costs and the cost to comply with the State's Resource Adequacy program. MRW recommends that these variables be more explicitly explored if the City further considers CCE formation.

The risks that are qualitatively addressed in the Study include regulatory risks, working with SCE, grid reliability, the availability of renewable and greenhouse gas (GHG)-free resources, and competition with SCE's Green Options. These risks, as noted by the Study, will continually arise but are difficult to quantitatively assess, making these risk important and deserving of attention.

Disruptive Technologies

New entities like CCEs must be aware of what technologies might disrupt their business model and how to respond to the challenges and opportunities they present. MRW considered three disruptive technologies that a new CCE should be aware of: transportation electrification in general and electric vehicles in particular; customer-side generating technologies such as rooftop solar; and energy storage in the form of batteries.

Electric vehicles. Orange County has a significant amount of EVs, with over 28,300 vehicles as of the end of 2016 and an estimated 145,500 EVs by 2025.[5] From a CCE perspective, EVs offer both opportunities and risks. On the risk side, if EVs are charged at inopportune times of the day, such as when wholesale power prices are high, they can exacerbate power procurement problems. This can be handled through setting EV charging rates to incentivize EV owners to

[5] California Energy Commission, *California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025Future Infrastructure Needs for Reaching the State's Zero-Emission-Vehicle Deployment Goals* (March 2018), p. 9, Appendix A-2 & E-1

charge at low-cost hours. On the other hand, EVs offer opportunities to help lower vehicle GHG emissions and contribute to local climate action goals. Future EVs may incorporate bidirectional charging technology, where the car's battery can be used to power a home or the grid. This technology is still in its infancy for light-duty vehicles but there are pilot projects underway for medium/heavy duty vehicles.

Rooftop Solar. Although there are many benefits derived from the increased utilization of customer-owned solar photovoltaic (PV) systems, such as emissions reductions and local job creation, they also present potential challenges to a CCE. First, rooftop PV creates operational challenges for CCEs and utilities, such as at times providing more power to the grid than can be used. Increased PV may lead to sales and revenue losses for CCEs since they displace CCE power sales. However, because CCEs can set their own rates, they could adapt rates to fit changes in their customers' load.

Energy storage. California has seen increases in energy storage recently due to storage technologies becoming cheaper coupled with policies to encourage its use. The most common type of storage technology used is battery storage. Battery storage systems are frequently paired with solar PV installations to allow extra energy to be stored in the batteries and used when needed, such as in the early evening when electricity demand is still high but solar generation has fallen off or on partly-cloudy days.[6] While solar PV plus battery storage has several important benefits, these systems do have potential costs from the standpoint of a CCE. For example, like PV alone, batteries+PV located on a customer's side of the electric meter allow the customer to generate almost all of their own energy and use battery storage to store the energy for later use. This not only reduces CCE revenue but also requires the CCE to carry certain fixed costs to be sure they can be served in case the customer's systems fail.

Governance Options

The Study addressed the four CCE governance options available to Irvine, accurately describing each of their benefits and risks. Of the four options, MRW and the Study both found that two are more reasonable: Forming an Irvine-only CCE as a City Enterprise, which was modeled in the Study, or joining with other like-minded Orange County cities to form a full-service CCE JPA.[7] MRW understands that this latter option is preferred by the City.

Forming a CCE program as a City Enterprise allows for the greatest control and flexibility and creates less complicated governance. The City Council simply serves as the Board authorizing CCE program structure and programs. On the other hand, the City Enterprise model requires City resources to form and operate. A City CCE program also requires special care to protect the City's General Fund from CCE program obligations.

[6] *Ibid.*

[7] This is in contrast to a "JPA Light," such as the California Choice Energy Authority, wherein like-minded cities join together to share CCE operating costs under another formal agreement. Each retains local decision-making control over CCE program operations (power portfolio mix, rates, local generation, and programs) but share centralized services such as regulatory monitoring and intervention, legal, power procurement, and billing. The JPA-light model is well suited for small jurisdictions, but is less so to larger cities, such as Irvine, where there are sufficient economies of scale to operate as a stand-alone CCE or be a lead jurisdiction in a full service JPA.
.

Under an Orange County JPA, each jurisdiction would be a voting board member. Depending on the voting structure established by the JPA, and the number of participating cities, the amount of local control for Irvine will be reduced relative to the City Enterprise model. Furthermore, a JPA CCE program provides greater financial protections to the City by keeping its books completely separate from the CCE's. Lastly, the level of effort to form may be equal to or greater than forming a City Enterprise CCE program, as all of the foundational documents would have to be prepared with input from other jurisdictions.

The two biggest hurdles to forming an Orange County CCE JPA are coordination with other jurisdictions and time. On coordination, MRW understands that Irvine has reached out to neighboring cities concerning forming a JPA. This effort will need to continue but is undoubtedly hampered by the more pressing issues surrounding the COVID-19 outbreak. Thus, JPA formation could roll into 2021, allowing for a 2023 launch, at best.

A faster possible path forward is to initially form a city-only CCE program with the intent of having other cities join via JPA formation. Or, if at least one other jurisdiction is willing to move forward with Irvine, then the two cities form a JPA with the intent of having additional communities join later. Both of these paths have been taken by operational CCEs.[8] Thus, Irvine would need to balance any desire to form a CCE program in 2022 (the earliest possible date) versus having a fully populated JPA at startup, which would likely delay the process at least one year.

CCEs in California

There are now 19 community choice energy providers serving more than 10 million customers in over 170 cities throughout California. They serve nearly half the retail load in PG&E's territory and are rapidly increasing in both SCE's and SDG&E's territory. Were Irvine to form a city-only CCE, it would be near the median in size (load-based), with about half of the operational CCEs being smaller and half being larger.

To explore CCE "lessons learned," MRW drew upon its experience working for CCE providers and interviews with leaders at seven CCE programs and key members of the California CCE community. In talking with these CCE leaders, the advice that kept coming up is, "keep foremost in mind why the City is forming a CCE program." Lower rates? Greater local control? Reduced carbon emissions? Whatever the reason, the City's leaders must keep that goal in mind throughout the start-up process, both as policies are set as well as in communicating with the public.

The CCE leaders also emphasized that the real benefit of CCE is transparency and local control: CCE programs are able to reflect what the community wants and are able to tailor services to the

[8] Solana Beach formed a city-only CCE (Solana Energy Alliance) and began in April 2018. In November 2019, Solana Beach joined with the cities of Carlsbad and Del Mar to form the Clean Energy Alliance JPA. Similarly, Desert Community Energy, initially planned on launching in the summer of 2018 with 3 JPA members. However due to poor market timing, its launch was delayed until April 2020, with only one city, Palm Springs, participating in the initial launch. Cathedral City and Palm Desert may join in their own time.

community. One respondent explicitly said that his proudest accomplishment was successfully integrating many local professionals into his CCE's staff. Another said that providing local engagement in energy issues was his proudest accomplishment.

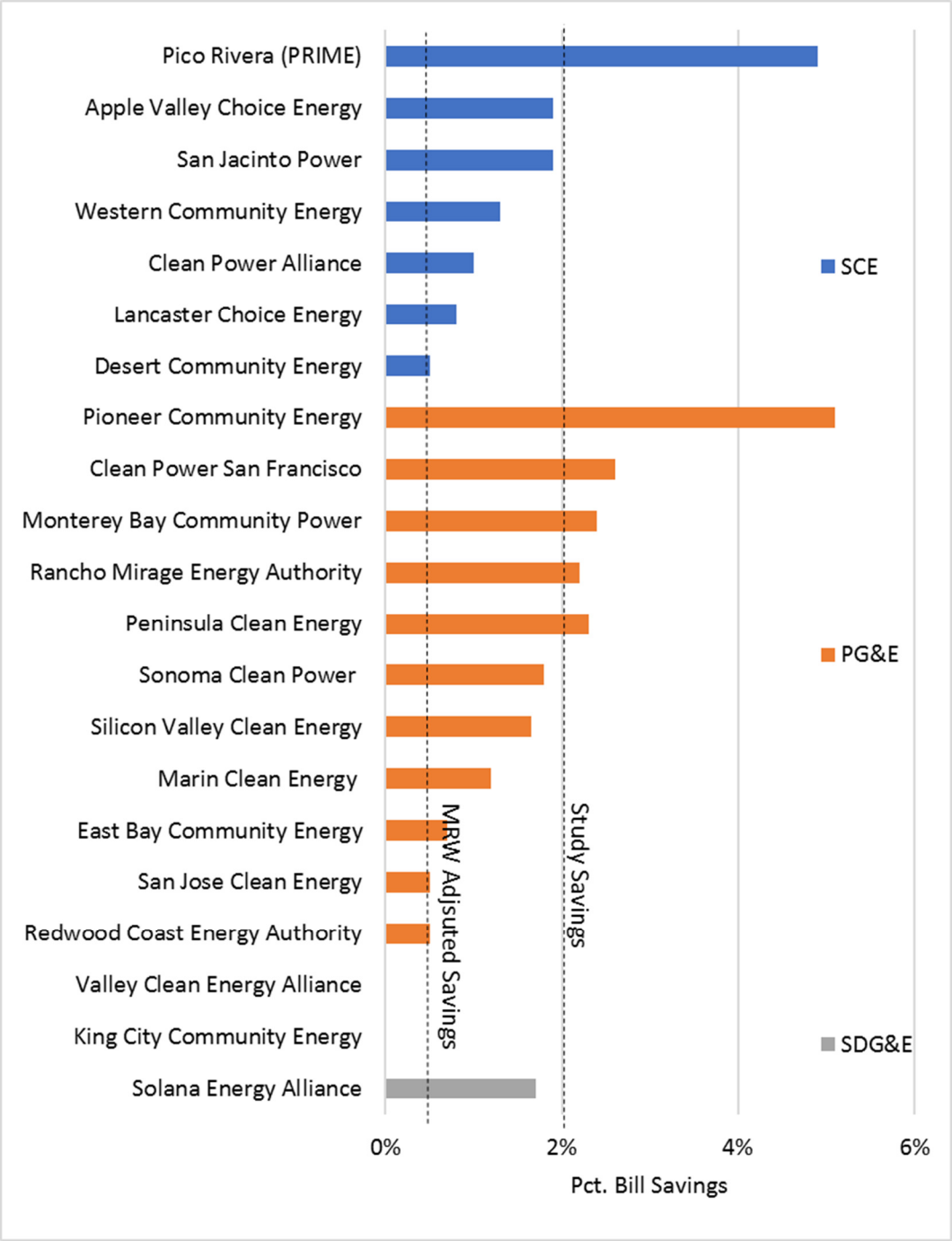
When MRW asked the CCE leaders "what keeps you up at night," the universal response was what might happen at the CPUC, i.e., regulatory risk. They believe that the CPUC does not understand or appreciate the internal structures and oversights provided by CCEs and feel that the CPUC is treating them like a profit-motivated investor owned utility.

With respect to starting up a CCE, the advice is, "do not underestimate the effort needed to launch." In particular, allow plenty of time for communication with not only the community at large but also key interests, such as local environmentalists, community activists, and labor. Aim to have these groups well informed, and on your side, before trying to launch. Also, bring on key personnel (Executive Director, CFO) and key service providers (e.g., bank, legal counsel, power procurement contractor) early in the process (e.g., 9-12 months before targeted launch).

Last, the interviewees agreed that in forming a JPA it is important that all the members have similar priorities and goals. This is consistent with the City's interest in forming an Orange County JPA. Some also noted the time required to bring on all the communities—the need for public hearings and input in each jurisdiction and the drafting and multiple readings required to pass a JPA ordinance.

To cross-check the rate results of the Study, MRW compared the percent rate savings available from the Study, with and without MRW's adjustments, to the residential rate savings currently being offered by existing CCAs. This comparison is shown in the figure below. As the figure shows, 13 of 21 CCEs offer residential rate savings between 0.5% and 2% (the range suggested by the Study and MRW), six offer greater rate savings and two offered no savings.

Current (June 2020) CCE Program Residential Rate Savings



Conclusions

- The Study's analytical approach is sound and most of the variables used are reasonable, albeit not necessarily conservative.
- MRW has concerns with two variables: the Study's cost to comply with Resource Adequacy requirements and its forecast of SCE retail generation rates. When MRW made high level adjustments to these two variables, the CCE continued to be financially feasible, albeit with tighter financial margins and lower rate savings: down to about 0.5% from the Study's 2%.
- The 0.5% (MRW) to 2% (Study) rate savings is consistent with what CCEs are currently achieving.
- Given current conditions, Irvine (or any jurisdictions with whom Irvine might form a JPA) will likely be called upon to provide collateral to backstop the CCE's financing.
- There is great uncertainty in many of the inputs, particularly the SCE Rate and the PCIA. As such, if Irvine chooses to move forward with CCE formation, it should closely monitor SCE rates as well as the wholesale power market and be prepared to delay service if the variables line up adversely.
- The Study appropriately notes that financial and regulatory risks can be addressed and at least partially mitigated through a rate stabilization fund, proper supply portfolio management, and/or CPUC monitoring and participation.
- The Study did not address two important sensitivity variables: wholesale power costs and the cost to comply with the State's Resource Adequacy program. MRW recommends that these variables be more explicitly explored if the City further considers CCE formation.
- Potential disruptive technologies like electric vehicles, rooftop solar, and battery storage would require significant adoption in order to have any impact on CCEs. Any potential risks associated with these technologies can be handled by incentivizing particular charging times or bidirectional charging (EVs), rate modifications (rooftop solar), or battery output regulation (battery storage).
- MRW and the Study both found that two governance options were reasonable: Forming an Irvine-only CCE as a City Enterprise, which was modeled in the Study, or joining with other like-minded Orange County cities to form a CCE JPA. This latter JPA approach is better suited to a large city like Irvine than the "JPA-Light" model, which is appropriate for small cities to jointly share certain costs and functions.
- Forming a JPA takes time. One possible faster path forward is to initially form a city-only CCE program with the intent of having other cities join via JPA formation.
- In talking with these CCE leaders, the advice that kept coming up is, "keep foremost in mind why the City is forming a CCE program. The CCE leaders also emphasized that the real benefit of CCE is transparency and local control. CCE Leaders were most concerned with regulatory risk, especially the PCIA. With respect to starting up a CCE, the advice is, "do not underestimate the effort needed to launch." Last, the interviewees agreed that in forming a JPA it is important that all the members have similar priorities and goals.

1. Financial Results and General Findings

This section reviews the analytical approach, assumptions, and results of the Study's pro forma financial analysis. Table 1 summarizes MRW's findings on the Study's financial analysis. Each entry is discussed in the following sections.

Table 1. Financial and General Findings Summary

		Conservative	Reasonable	Potential Issue
	Modeling Approach		X	
Load Assumptions	Load Forecast		X	
	Line Losses	X		
	Opt-Out Rate	X		
CCE Power Assumptions	CCE Power Portfolio		X	
	Wholesale Power Prices		X	
	Renewable Power Prices	X		
	RA Costs			X
	Grid Charges	X		
CCE Admin. and Other Cost Assumptions	Startup Costs		X	
	Financing Costs		X	
	Admin. Costs		X	
SCE Rate Assumptions	PCIA		X	
	SCE Generation Rate			X
Economic Analysis	Jobs Analysis	X		
	Economic Development		X	

A. Study Approach

The Study's financial analytical approach is sound and complete. It includes all the necessary expense and revenue categories and modeled a CCE program's pro forma cash flow accurately.

B. Study Assumptions

This section reviews each of the major assumptions that the Study makes and opines on the reasonableness of the assumptions. While most of the assumptions made by the Study were reasonable, two of the assumptions were understated or outdated. Additionally, many of the assumptions that the Study characterizes as "conservative" MRW would consider acceptable, but not necessarily conservative.

1. Load Forecast/opt-out

The magnitude of the costs and revenues a CCE program incurs depends upon the electric load that it serves. MRW finds the Study's load analysis and forecast to be reasonable to conservative. The Study's forecast begins with actual electric load data provided by SCE and assumes conservative opt-out rates: 5% for residential accounts and 10% for commercial/industrial accounts. (That is, 5% of possible residential customers and 10% of possible commercial would choose not to participate in the CCE program.) With one notable exception, opt-out rates seen by recent CCE program launches have been less than this, making the assumption conservative. The exception is the Clean Power Alliance of Southern California (CPA), the CCE that serves Los Angeles and Ventura counties, which experienced a much higher opt-out rate, closer to 50%, for its largest industrial customers. This was because CPA chose not to offer rates that were lower than SCE's for this customer class, but instead chose to set rates at levels equal to CPA's cost to provide power to them. Because the CPA rates were higher, and this class is especially sensitive to power costs, a large fraction of them declined to take service from CPA. (This issue of competitive rate setting is discussed in greater detail in the Risk section of this report.)

Beyond the opt-out, the Study must make assumptions concerning how the load will change over time. The study assumed an annual average growth rate of 0.6%, which is consistent with long-term forecasts made by the California Energy Commission and is reasonable.

2. Power Costs

As the Study notes, around 90% to 95% of a CCE's program's costs are associated with the procurement of power. As such, the assumptions concerning the costs, sources, and mixes of the power are particularly important. Overall, the Study's power cost related assumptions are reasonable. The exception to this is the Study's assumption concerning the cost of meeting the State's resource adequacy requirements—costs imposed on all utilities and CCAs to ensure electric grid reliability, which is out of date and understated. This is discussed in the following section.

In general, the main variable a CCE can manipulate to adjust its total power costs is how much renewable power it will use. At a minimum, the CCE would need to meet State mandated Renewable Portfolio Standard (RPS) requirements: 33% of the CCE's total power must be provided by renewable resources in 2020, 40% by 2024, 52% by 2027, and 60% by 2030. The Study's base case assumes that the CCE meets this requirement. It also includes two additional scenarios: one in which 50% of retail loads are served with RPS-qualifying resources in 2022 ramping up to 80% in 2025, 90% in 2030 and 100% by 2035; and one in which 100% of retail loads are served with RPS-qualifying renewable resources in all years. The last scenario should be seen as a hypothetical benchmark—i.e., not a reasonable plan for a new CCE. The Study found, unsurprisingly, that in the 100% renewable case the CCE's costs would consistently and significantly exceed SCE's rates and was not emphasized.

Given the total amount of renewable power being purchased in each scenario, the next question is whether the assumed sources of renewable power and the associated costs are reasonable. For this renewable power, the Study assumed a reasonable mix of short- and long-term contracts which would comply with State renewable contracting requirements. While MRW would have

liked to have seen more explicit assumptions on the power sources (e.g., the mix of solar, wind, and geothermal), the prices assumed are reasonable.

For the cost of non-renewable power, the Study relied upon EES's subscription to a market price forecasting service, S&P Global. This is a reasonable choice for a market power price forecast and consistent with other long-term California wholesale price forecasts made in late 2019.

3. Other Power Procurement Related Costs

While the raw cost of energy is the greatest single cost, there are other costs associated with the CCE's procurement of power. These include costs paid to the California Independent System Operator (CAISO) to manage the power grid ("ancillary services"); the costs to the CCE to balance the power the CCE needs on a minute-by-minute basis (scheduling); and the costs to comply with the State's Resource Adequacy (RA) program. With respect to the ancillary services, the Study makes very conservative assumptions, starting with current ancillary services costs and escalating them at 20% per year for the first 5 years and at 5% per year thereafter. The cost of scheduling is very modest at $0.0004/kWh, escalating at about inflation (2.5% per year). This, too, is reasonable.

MRW has concerns about the third cost area, the assumed cost to meet the state's RA requirements. As the report notes, the CCE must demonstrate it has enough physical power supply capacity to meet its projected peak demand plus a 15% reserve margin, on a monthly basis. The Study assumes the cost of basic ("system") RA to be $4.50/kW per month, escalated at 3% per year. At this level, RA compliance accounts for about $15 million of the CCE's total costs. MRW spoke with professionals at and supporting CCEs and found that system RA is currently costing CCE roughly double that: $8-$10/kW per month. To account for higher RA costs, MRW increased the Study's pro forma RA cost by 50%. This is a compromise between the tight market for RA currently being experienced and the Study's prices, which reflected a more liquid market. With these higher RA prices, First Year Net Income would go down from $6.7 million to $1.5 million and the Average Net Revenue (2022-2030) would go down from $16.1 million to about $8 million (Table 2).

Table 2. MRW Adjustment to Study's RA Costs

	Study	MRW Adjustment
2020 System RA	$4.50/kW-month	$8.00-$10/kW per month
RA cost adjustment		Study x 1.5
10-yr. Annual RA Cost	$15.3 million	$23.0 million
10-yr. Annual Cost Difference		$8.3 million

The report aptly points out that the RA program in California is a work in process: "The CPUC undertakes annual policy changes to the RA program, so these requirements may change by the time program launch occurs. Different types of resources have different capacity values for RA

compliance purposes, and those values can change by month." As such, it is conceivable that the RA prices could drop down again to the values used in the Study over the next 2-5 years.

4. CCE Operating Costs

As noted, ~95% of a CCE's costs are associated with power procurement, leaving the remaining 5% with CCE operating costs. The Study thoroughly presents what types of activities a new CCE program should expect along with providing reasonable detailed estimates for the costs of those activities.

5. CCE Financing

The Study estimates the pre-launch and working capital needs an Irvine CCE program would require. MRW finds the pre-launch requirements of $2.05 million to be reasonable to conservative. The $8 million for working capital represents approximately 30 days of CCE expenses. This is consistent with what MRW has seen in other CCE launches.

However, in reviewing the detailed pro forma, it does not appear that the $2.05 million of pre-launch expenses are accounted for. The pro forma provided to MRW showed total debt and equity payments of $8.8 million, which includes interest, paid over 5 years, indicating that it assumed financing of only the $8 million of working capital and did not include the start-up costs. For practical purposes, this $2.05 million would likely be rolled into the initial capital infusion at launch, i.e., the City would front the CCE this amount, and be reimbursed when the CCE received financing. Still, increasing the start-up debt by ~$2 million should not materially impact the Study's conclusions.

The Study assumes that the working capital would be provided via a bank loan, paid off over three years, while noting that most CCEs rely on a line of credit rather than a loan for working capital. In either event, the loan or line of credit will likely require some kind of collateral or guarantee. The Study provided examples of CCE formation funding, many of which required guarantees or loans from JPA members (Clean Power Alliance, Sonoma Clean Power, Peninsula Clean Energy, Silicon Valley Clean Energy, Clean Power Alliance, CleanPowerSF). One CCE, Marin Clean Energy, used outside investors to provide loan guarantees.

The experience of the most recent large CCE formed, San Diego Clean Power (SDCP), is instructive of what is currently required for CCE financing in the current environment of tight CCE margins and tight credit markets. SDCP issued a Request for Proposal (RFP) for banking services in October 2019, approximately 16 months prior to its target launch date. Its pro forma showed net operating margins (projected revenue minus operating costs, net financing costs) with a 1% rate savings of approximately 6% over its first five years of operation. (For comparison, the Study estimates the average net operating margin over its first five years to be 9%, or 4% using MRW's assumption on RA compliance cost). Because of this narrow operating margin and general uncertainties facing CCAs, SDCP's finance provider, River City Bank, required SDCP to have $5 million in collateral in order for it to provide a $5 million pre-launch loan plus a $35 million line of credit.[9] Like Marin Clean Energy, SDCP's collateral was provided

[9] See, SDCP April 23, 2020 Board Packet, Staff Report on Item 4. (See html link on https://www.sdcommunitypower.org/board-meetings)

by a third-party, Emerald Blue, LLC. Emerald Blue is a San Diego-based philanthropic individual with interest in supporting local climate action, who had previously expressed interest in supporting SDCP.[10]

Irvine should thus be aware that if it moves forward with CCE in 2022 it should anticipate that similar collateral could be requested by its finance provider.

6. SCE Rates

Critical to the cost-effectiveness of an Irvine CCE program is the rates it can offer relative to those offered by SCE. Thus, the forecast of SCE's generation rates and PCIA are equally as important as the forecast costs to operate the CCE program.[11] The Study appears to perform its forecast of SCE generation rates by starting at the known 2020 SCE generation rates and escalates them according to the known attributes of SCE's portfolio of generation resources. In response to questions, EES clarified and amplified its rate forecasting process:

> At the time of the forecast (Spring/Summer 2019), SCE generation rates were forecast to be fairly steady in the near-term, so EES estimated a conservative 0% growth for the first 3 years [i.e., 2022 through 2025][12]. After this, the generation rate is forecast to increase near a historic average annual increase of 2-3%/year [3% per year is used from 2025-2031] which accounts for the same market price escalator used to calculate the CCE power costs, SCE's 2018 resource mix, forecast RPS requirements, and forecast renewable energy prices.

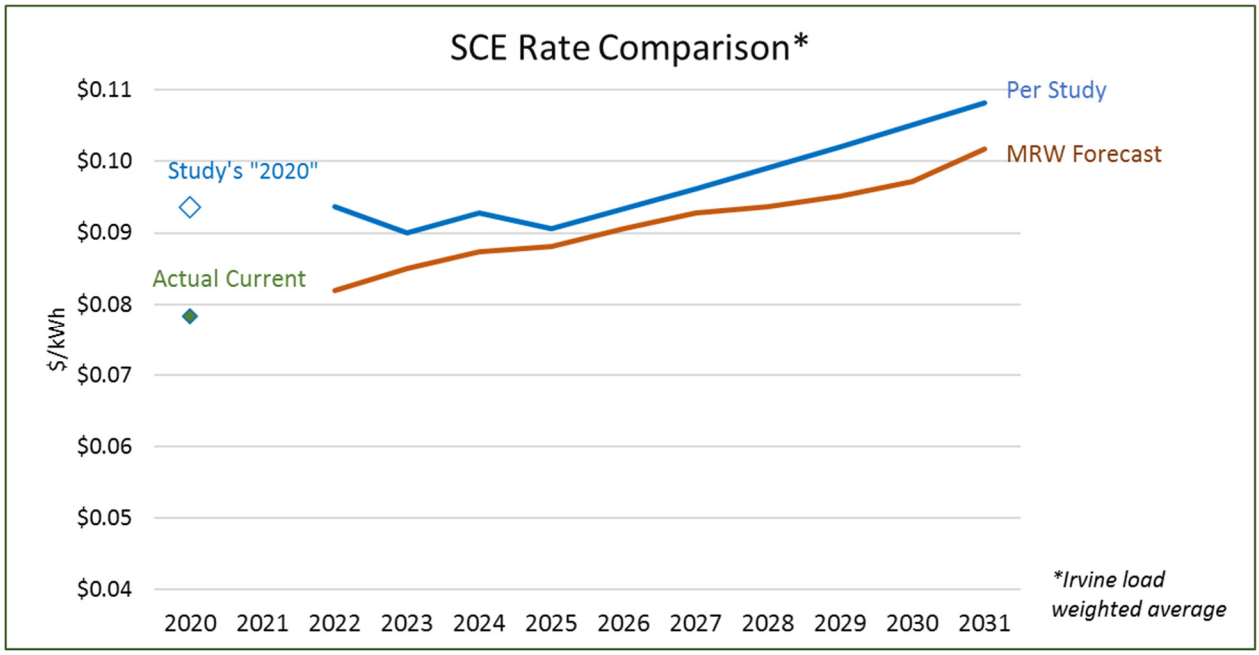
MWR has two concerns with this approach, First, the wholesale power market price assumptions should be consistent between the CCE rate forecast and the SCE generation rate forecast. While there are reasons that one might have lower or higher costs than the other for a particular product (e.g., CCEs can use tax-free debt to finance generation projects while SCE cannot), both will participate in the wider Western US gas and power markets and therefore will be subject to the same underlying market forces. While the Study does at a high-level account for SCE's portfolio and the impact of wholesale power costs on its generation rates, the connection is not as strong as MRW would like.

Second, the 2020 Irvine load weighted average SCE generation rate that the Study shows, ~9.2¢/kWh, is higher than what MRW believes is actually in place: ~7.9¢/kWh.[13] This is

[10] *Ibid.*
[11] Recall, for a customer to financially benefit from CCE service, the CCE rate plus the PCIA must be less than SCE's generation rate.
[12] Having rates flat for the first few years is conservative relative to beginning escalating them immediately.
[13] SCE does not directly publish its "system average rate." The 7.9¢/kWh value is based on MRW's analysis of SCE recent rate filings (Advice Letters 4172-E, -E-A and -E-B). It is consistent with the rule of thumb that SCE's residential generation rates are about 20% higher than its system average generation rate. The current Residential generation rate (Schedule D) is 9.6¢/kWh. (see https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/residential-rates/ELECTRIC_SCHEDULES_D.pdf) Using this metric, SCE's system average generation rates should be about 8¢/kWh. MRW requested EES to provide specific citations as to the 2020 rate it used, but none were provided.

illustrated in the Figure 1 below, which takes the SCE rate from the Study's Exhibit 38[14] and overlays the current SCE system average generation rate and MRW's current forecast of SCE's generation rate.

Figure 1. SCE Generation Rate Forecasts



The data underlying the corrected Exhibit 38 shows that, on average over the study period, the CCE costs were 1.37¢/kWh less than the SCE rate. Therefore, subtracting 1¢/kWh from the SCE generation rate would decrease the average CCE cost savings by 1¢/kwh to 0.37¢/kWh, or a rate savings of about 0.5% rather than 2%. The impact on the annual average cost savings, CCE-wide and for the City's municipal accounts is shown in Table 3. Thus, even with the SCE rate adjustment, the CCE could offer comparable, if not nominally lower, rates that SCE.

Table 3. Impact of Adjustment to SCE Rates

	Per Study	SCE Rate Adjustment	Adjusted Value
Ave. Annual Cost Savings	$7.7 million	($5.8 million)	$1.9 million
Ave. Annual City Accounts Cost Savings	$112,000	($84,000)	$28,000

[14] Note that the Study's Exhibit 38, while labeled "Rate Comparison SCE Renewable-Equivalent Portfolio," the figure actually shows the comparison for the 100% renewable scenario. EES provided MRW the analogous data for the SCE Renewable-Equivalent portfolio, which is used in this analysis.

7. PCIA

The Power Charge Indifference Adjustment (PCIA) is a fee charged by SCE to prevent customers that remain with SCE bundled service from paying for energy generation procured on behalf of customers that have since switched to CCA service. More specifically, it pays for the above-market costs of SCE generation resources that were acquired, or which SCE committed to acquire, prior to the customer's departure to CCA. Bundled customers also pay the PCIA, but it is embedded into the commodity portion of their total rate.

The PCIA is the single largest uncertainty in a CCE analysis. It can vary significantly from year to year, depending upon the wholesale power market, the costs of RA, the costs of renewables, and how well the prior years' PCIAs collected the correct amount so as to keep non-CCE customers whole. It can increase up to 0.5¢/kWh (roughly 25%) year over year due to market changes but can increase even more due to insufficient funds being collected in the PCIA ("undercollections").

The Study is opaque as to the PCIAs values assumed and how they were calculated. Nowhere in the Study was the PCIA value explicitly presented, nor any detailed explanation of how the values implicitly used were calculated. The data provided by EES shows that the assumed PCIA is relatively flat from 2022 through 2030 at about 1.8-2.0¢/kWh. With that said, the 1.8-2.0¢/kWh values shown in Exhibit 38 appear roughly consistent with MRW's current PCIA forecast for SCE.

8. Jobs Analysis

The Study's analysis of the employment impacts of the CCE program is reasonable to conservative. The Study used the industry standard macroeconomic input-output model IMPLAN to estimate the new jobs created based on the rate savings. To the extent the rate savings is less—or greater—than that shown in the study, the jobs impact would be change proportionally. Additionally, the analysis is conservative in that it does not include the direct or indirect employment impacts of those working for the CCE, nor the jobs created by any programs the CCE might generate.

C. Conclusions

- MRW found the analysis to be sound and most of the variables used to be reasonable, albeit not necessarily conservative.
- The Study's cost to comply with Resource Adequacy requirements are about ½ of the current costs. Increasing the Study's cost to comply with Resource Adequacy requirements by 50% would lower net revenues (revenues minus expenses) by about $8 million (50%).
- Adjusting the Study's forecast of SCE retail generation rates to reflect SCE's current rates reduces the potential rate savings from 2% to 0.5% or from 1¢/kwh to 0.37¢/kWh. Even with the SCE rate adjustment, the CCE could offer comparable, if not nominally lower, rates that SCE.
- Even accounting for these two adjustments, a CCE is still likely financially feasible. (See Table 4, below)

- A 0.5% (MRW) to 2% (Study) residential rate savings is consistent with what CCEs are currently achieving. However, note that CCEs do not necessarily offer equal rate discounts to all customer classes, often with non-residential customers experiencing smaller discounts or even, as discussed above with PCIA, no rate discounts.
- As the Study's Exhibit 38 shows, the savings at the beginning are lower than in the latter years. Thus, the models suggest that margins will be particularly tight in the 2022-2025 timeframe. This could create challenges in getting financing without Irvine or other JPA members providing collateral to backstop the financing, as well as establishing a rate stabilization fund.
- There is great uncertainty in many of the inputs, particularly the SCE Rate and the PCIA. No one can say precisely what the situation will be in 2022; it could be more favorable than what is shown in the Study, or less. If Irvine moves forwards with a CCE launch in 2022, it must be prepared to defer launch if the variables are lining up poorly. (This is what Desert Community Energy did in 2018, when market prices spiked when it planned to launch, forcing the CCE to defer operations until 2020.)

Table 4. MRW Adjustments to Study

	Per Study	RA Adjustment [1]	SCE Rate Adjustment [3]	Adjusted Value
Average CCE Net Revenue [2]	$16 million	($8 million)		$8 million
Ave. Annual Cost Savings	$7.7 million		($5.8 million)	$1.9 million
Ave. Annual City Accounts Cost Savings	$112,000		($84,000)	$28,000

[1] RA adjustment = Study's RA Value + 50%, which is the simple average of the Study's and MRW's adjusted values.
[2] Assumes same CCE and SCE rates as Study, and thus the same rate savings. Reduced CCE net revenues mean less funds available for programs or contributions to reserves.
[3] Based on 2% savings per Study (p. 2) and 0.5% savings, per adjustment.

2. Risk Assessment

The creation of a CCE can place risks on a city and its residents and businesses. Some of these risks are significant, while others are less important. Many of the financial risks—market prices, renewable prices, SCE rates, PCIA, and opt-out, were addressed in the Study's sensitivity analyses. Others, such as regulatory risk beyond the PCIA, the Study discussed qualitatively. This section first highlights the quantitative risks assessed in the Study's sensitivity analysis and then addresses the Study's assessment of the risks not quantitatively assessed.

The Study's Exhibit 39 is a table that succinctly presents the risks to a CCE, how likely each risk is to be encountered, the severity of each risk, strategies for mitigating each risk, and the potential for the risk to "suspend" CCE formation. MRW concurs with the Exhibit's characterization of risks and mitigation strategies. MRW's review highlights areas of particular importance and where circumstances may have changed since the Study was drafted.

A. Quantitative Risk Analysis-Sensitivity of Results to Key Variables

1. Renewable Power Cost Risk

Related to the ability of the CCE to procure power at reasonable costs is the CCE's ability to enter into the necessary power supply agreements, particularly for renewables. The Study analyzed the risks related to the costs associated with the potential renewable energy offerings of a CCE. The Study included Low, Base, and High Cases, with the Base Case reflecting current Power Purchase Agreement (PPA) costs in the region. The Low Case and High Case represented PPAs from lower cost renewables and PPAs from older, costlier renewable resources, respectively. The take-away from the renewable power cost analysis is that the High Cases circumstances would increase the cost to the CCE by 0.8¢/kwh to 1.4¢/kWh, which as shown in Figure 2, is an important factor to consider when evaluating the cost risks to the CCE.

2. PCIA Risk

The PCIA is a legislatively mandated fee that SCE must charge all CCA customers. The fee is designed to protect SCE's remaining full-service customers from any financial harm that might be caused by the load reduction from CCE formation. The magnitude of the PCIA is critical whether the CCE can "meet or beat" SCE's costs of service. Because a CCE's rates must incorporate the PCIA, any significant rise in the PCIA may impact the cost competitiveness of a CCE. Although the Study expects the PCIA to decline over time due to increases in market prices and the expiration of SCE's older, expensive power contracts, it appropriately acknowledges the risk associated with PCIA volatility. The impact of fluctuations in the PCIA is of great concern to many CCEs and the Study is correct to highlight this issue. For the quantitative sensitivity, the Study's low scenario is 10% lower than the Base Case. For the high scenario, the PCIA increases by the full cap of $0.005/kWh in the first 2 years (2022 and 2023) and then decreases at an average of 5% per year.

This sensitivity approach is reasonable, although the City should be aware that the PCIA will likely be very volatile, and annual increases higher than the cap can occur, and in fact is likely to occur later in 2020.

3. Load and Opt-Out Risks

Sensitivity to changes in projected loads has been tested for the high and low load forecast scenarios. For the sensitivity analysis, the low case assumes a -0.14% growth in energy and customers after 2019, while the high scenario assumes a 1.36% growth in energy and customers. This sensitivity approach is reasonable.

There is a risk to a CCE should a significant number of customers opt-out and return to SCE during CCE launch. The low participation scenario has an opt-out rate of 20% (80% participation). Currently, no operating CCEs have encountered opt-out rates as high as the low participation scenario. This sensitivity approach is reasonable.

As is consistent with MRW's prior CCE feasibility analyses and reviews, the sensitivity to lower CCE participation and higher or lower load growth is minimal. This is because the cases implicitly assume perfect foresight: the CCE's power purchase portfolio matches its load, no matter what the assumed load is. In practice, the greater risk is to significant, unexpected changes in load. To counter this, the CCE must have a robust procurement risk strategy in place to account for changes in load as well as changes in prices.

A related, but unquantifiable opt-out risk is the possible opening of Direct Access to all non-residential SCE customers.[15] If this comes to pass, the CCE would have to directly compete with non-utility electricity service providers (ESPs), who have much more flexibility than SCE, and likely the CCE, in offering customer-specific energy pricing and products. Given that 70 percent of the City's load is associated with commercial and industrial customers, this poses a real risk of load loss. However, the Study does note that a combination of lower rates and good customer service will help retain customers in the long run.[16]

4. Renewable Content

As two additional sensitivity cases, the Study created two alternative CCE renewable power content portfolios. In the "100% Renewable by 2035 Portfolio," the Study assumed that the City CCE's resource portfolio is 50% GHG-free in 2021 and ramps up to 90% GHG-free in 2030. The 100% Renewable portfolio assumes 100% GHG free resources in all years. MRW sees these two cases as additional portfolios to be assessed rather than risks to be identified and mitigated. The analyses show that the immediate 50% GHG-free option would be financially very similar to the base case (i.e. feasible) while the immediate 100% renewable portfolio case is not likely financially feasible.

5. SCE Generation Rate

In addition to the base SCE rates assumptions (3% per year), this study uses a high SCE rate and a low SCE rate, 2% lower and 7% higher than the base assumptions, respectively. While this range of escalation rates is reasonable, the bigger risk to the CCE is SCE's rates in the first few years. As seen in the Study's Exhibit 4, the margin between the CCE cost and SCE's generation rates are tighter in the first four years of the study, 2022 to 2025, than the 5 years after.

[15] *See*, Senate Bill 237.
[16] Study, p. 84.

6. Other Factors That Should Be Quantitatively Assessed

The Study omits two important sensitivity variables. The first is the cost of wholesale power. The "Power Cost" sensitivity addressed exclusively higher or lower renewable power costs. The dependence of wholesale market prices on the price of natural gas could result in an increase in market prices if natural gas prices increase. Additionally, carbon taxes and/or carbon cap and trade programs could lead to increases in wholesale market prices.[17] This is important because during most of the study period half or more of the CCE's power would come from natural gas generation or purchased from the wholesale power market. However, at the same time, SCE's generation rates would be impacted, albeit to a different degree, by the same market fluctuations, as would the PCIA.

The second factor is the cost to comply with the State's Resource Adequacy program. As discussed in Section 1.B above, present Resource Adequacy costs are currently two or more times greater than what was assumed in the Study. While MRW provided a high-level estimate of the impact of higher Resource Adequacy costs in Section 1.B.3, an explicit sensitivity case should be provided.

7. Interpreting the Sensitivity Cases

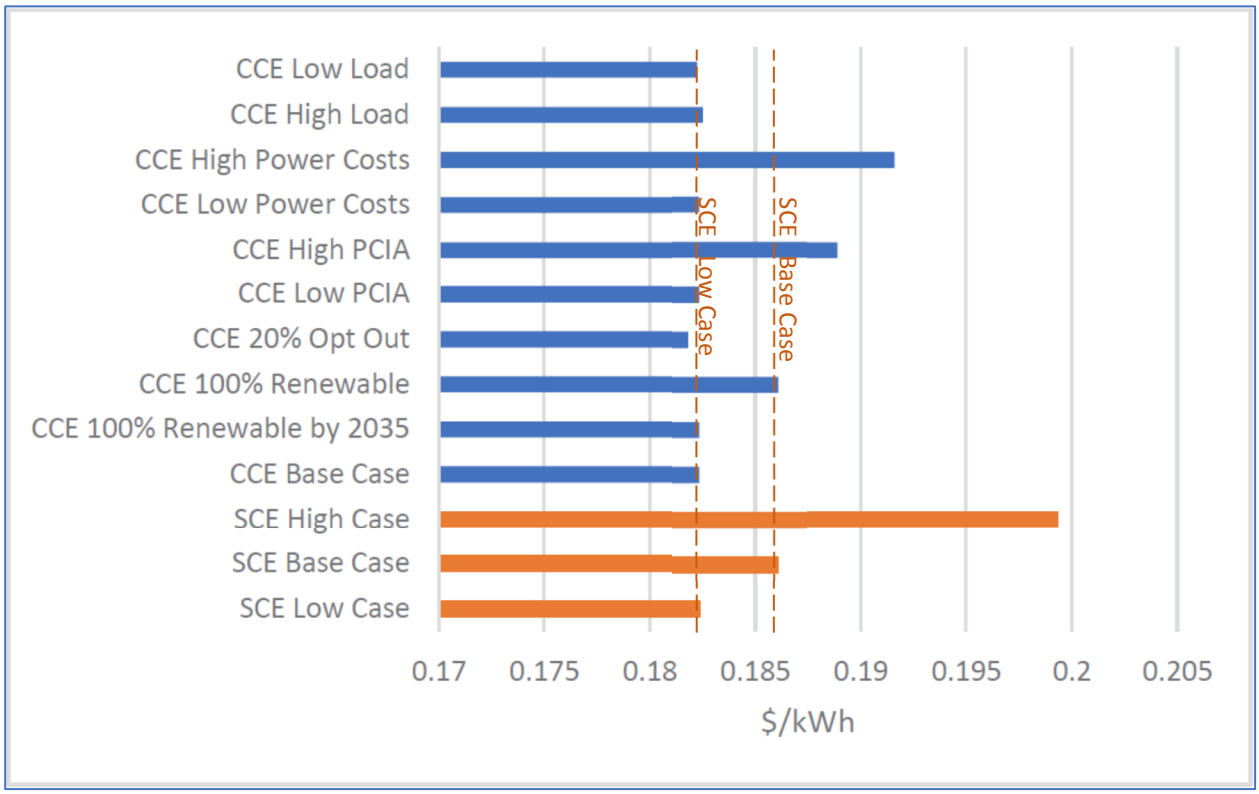
Figure 2 repeats the Study's Exhibit 43, which provides a comparison of the CCE total average rate (CCE rate plus PCIA plus SCE delivery rate) and SCE's system average rate under several scenarios. To highlight the comparisons, MRW added dotted lines at SCE's Low Case scenario and SCE's Base Case scenario. The figure highlights a number of important observations. First, as the Study notes, the CCE faces significant risk if its renewable power costs increase to the levels assumed in the "High" Case. Similarly, the CCE faces significant risk if the PCIA is higher than the forecast. Furthermore, if SCE's rates are near the Low Case scenario, the CCE's average rate is at best comparable to SCE's and rate discounts, even at only 2%, may not be achievable.

The Study appropriately notes that these risks can be addressed and at least partially mitigated by the following measures:

- a rate stabilization fund so that short-term events that result in lower SCE rates compared with the CCE rates can be mitigated by drawing upon the reserves rather than by rate increases;
- management of its supply portfolio so that it is not exposed to unmanageable risks associated with variable power costs; and
- monitor and actively participate at the CPUC on PCIA and rate matters.[18]

[17] Study, p. 80-81.
[18] Study, p. 85.

Figure 2. Study's Exhibit 43: Base Case Portfolio – Bundled Rates ($/kWh) 10-Year Levelized Average System Rate



B. Qualitatively Addressed Risks

1. Regulatory Risks

Regulatory Risks consist of uncertainty in regulatory decisions by the California Public Utilities Commission or laws passed in Sacramento that could adversely affect the costs that customers have to pay to take service from the CCE. These risks can include changes to the PCIA (discussed above), changes to the bonding requirements for the CCE, and changes in the CPUC's regulatory authority over CCEs (e.g., the CCE must submit and have approved long-term procurement plans), to name a few.

The Study aptly notes that regulatory issues continually arise and are difficult to assess and model. It identifies new legislation and the Cost Allocation Mechanism (CAM) as specific issues that may impact the competitiveness of a CCE. The Study identifies California Senate Bill (SB) 350 as a piece of legislation that impacts a CCE's resource planning and procurement. Although this legislation allows for continual planning and procurement autonomy, the long-term contracting requirement of this bill for renewable energy procurement is something CCEs should note. Regarding the CAM, the Study believes that there is a risk that this mechanism may push additional capacity resource costs on to CCEs. To combat this risk, the Study acknowledges that

a CCE would need to regularly follow the CAM and lobby at the local, State, and Federal levels to secure fair and equitable treatment for CCE charges.[19]

The regulatory risks the Study has identified are indeed important and require attention. MRW notes that the regulatory risks addressed in the Study are but a sample. As discussed elsewhere in the Study and this report, PCIA policy, the reopening of Direct Access, Resource Adequacy policy ("Grid Reliability"), and continued CPUC efforts to regulate CCEs can also be seen as regulatory risks.

2. Working With SCE

The Study appropriately notes that the CCE must work closely with SCE in many matters.[20] These include coordination during CCE launch and in the massive data exchanges between SCE and the CCE needed to accurately and timely bill CCE customers and collect revenue from them. The Study states that SCE has "practiced friendly and timely communication with CCEs." While MRW agrees that SCE made efforts to cooperate with CCEs, we also note that the CCEs have also experienced problems with SCE in CCE launches and data exchanges.[21] This further underscores the Study's recommendation to keep communication open and frequent.

3. Grid Reliability

As the Study notes, grid reliability refers to the continual and uninterrupted distribution and transmission of electricity throughout the State and directly to customers.[22] If the City were to implement a CCE program, SCE would still be the entity in charge of maintaining a reliable distribution system, and the CCE program is not expected to impact grid reliability.

The Study further notes that the CPUC's Resource Adequacy program supports grid reliability by ensuing there is sufficient generation available at all times. The Study also notes that there was, at the time of its drafting, a proposal for a central, Statewide power procurement entity "to purchase power and system grid resource needs on behalf of all load serving entities (Investor Owned Utilities (IOUs), CCEs, and Direct Access providers)."[23] Since the Study was finalized, a Decision has been issued by the CPUC which would reject a state-wide central power procurement entity and instead ordered SCE (and Pacific Gas & Electric) to act as procurement agents for "Local" RA only with each individual load serving entity to continue to be responsible for their own "System" RA.[24]

4. SCE RPS Share[25]

The Study notes that customers departing SCE for CCE service throughout SCE territory would have the effect of shrinking SCE's load, thereby increasing the share of renewables made up by

[19] Study, p. 79.
[20] Study, p. 78.
[21] *See*, SCE Application 19-08-013, Testimony Of Mark Fulmer On The California Choice Energy Authority And The Clean Power Alliance Of Southern California Concerning Service Fees Charged To Community Choice Aggregators. May 5, 2020.
[22] Study, p. 78.
[23] Study, p. 79.
[24] CPUC Decision 20-06-002
[25] Study, pp. 81-82.

SCE's current RPS contracts. SCE could further strive to compete with CCEs in terms of the environmental impact of its power portfolio. The Study notes that these forces could drive up the share of renewable energy in SCE's power mix to match or exceed the CCE's planned power mix. To mitigate this risk, the City CCE would have the option to acquire more renewable energy in response to changes in SCE's portfolio.

5. Availability of Renewable and GHG-Free Resources and Competition with SCE's Green Options[26]

The Study notes that SCE currently offers options to its bundled customers whereby the customer may purchase, at a premium, 50% to 100% renewable power ("Green Rate") or participate in SCE's "Community Renewables Program." [27] This latter option allows the customer to contract directly with a renewable project developer and purchase the rights to a portion of the output from a new locally-sited renewable generating facility. Customers participating in the Community Renewables Program will receive a credit on their SCE bill reflecting the amount of renewable energy purchased through the developer, but also pay the PCIA and other program costs (in addition to the price paid to the developer for the actual renewable power purchased.) The SCE Green Rate also comes with a price premium of 1.26¢/kWh (Residential).

The Study states that the risk to a CCE of these programs is whether enough renewables exist to supply both the CCE and these programs with lower-cost renewable energy. This risk is explicitly modeled in the Study as the "High Procurement Cost" scenario.[28] MRW notes that participation in both of these programs is nominal to *de minimus*[29] and as such would not lower the availability of lower-cost renewables. The greater source of this risk is other CCE programs who also may be aggressively purchasing renewable power.

[26] Study, pp. 82-83.

[28] Study, pp. 78-80.

[29] lacking significance or importance

3. Disruptive Technologies

Electric generation and storage technologies continue to evolve at a rapid pace. New entities like CCEs must be aware of what technologies might disrupt their status quo business model, for good or ill, and how to respond to the challenges and opportunities they present. However, the adoption of these technologies would need to be significant in order for them to impact the operations of a CCE. CCEs should have the ability to plan for and incorporate these technologies into their portfolios. This section briefly discusses the three major disruptive technologies that a new CCE should be aware of and follow: transportation electrification in general and electric vehicles in particular; customer-side generating technologies such as rooftop solar; and energy storage in the form of batteries.

A. Electric Vehicles (EV)

California has actively promoted the adoption of electric vehicles for many years, becoming the leader among U.S. states regarding EV use. At the end of 2017, California had 14,000 public EV chargers and around 350,000 plug-in EVs (PEVs), including battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), within the state. By California county, Orange County has a significant amount of PEVs, with over 28,300 vehicles as of the end of 2016, or around 12 percent of the PEVs in California. By 2025, it is estimated that the number of PEVs in California will reach 1.3 million, with over 145,500 EVs estimated for Orange County.[30]

The need to service both types of plug-in EVs has led California utilities to invest billions of dollars in EV charging infrastructure. Although CCEs have not invested in EV charging infrastructure at the level of utilities, they are doing so and have acknowledged the importance of providing support for these vehicles and supporting EV ownership through rebates and discounts, especially in regions with low numbers of EVs. CCEs are not only concerned with servicing existing customers who own EVs, but some CCEs also see the importance of EV use to lower greenhouse gas (GHG) emissions.

Overall, the benefits of increased EV use and charging infrastructure are believed to greatly outweigh any potential issues associated with this trend. Not only do EVs help lower vehicle GHG emissions, but future EVs may incorporate bidirectional charging technology.[31] Bidirectional charging technology would allow for a plugged-in car to provide additional electricity by using the energy in the car's battery for use in the home or the grid. Generally, the growth of EVs will mainly affect the electrical distribution grid that directly supplies power to customers, requiring the local utility to upgrade the distribution system. If the distribution system is not adequately maintained or upgraded, the costs of increased EV use could result in overloaded power lines and transformers or instability in the flow of power due to high levels of PEV charging.[32] However, utilities have been committed to upgrading EV charging infrastructure and the electrical distribution grid, making the aforementioned risks less likely.

[30] California Energy Commission, *California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025Future Infrastructure Needs for Reaching the State's Zero-Emission-Vehicle Deployment Goals* (March 2018), p. 9, Appendix A-2 & E-1

[31] The Growth in Community Choice Aggregation: Impacts to California's GRID. *UCLA Luskin Center of Innovation*, p. 33.

[32] Electric Vehicles and the California Grid, *Next 10* (July 2018), p.37.

B. Customer Side of the Meter Distributed Generation

California has seen dramatic growth over the past couple of years regarding behind-the-meter (BTM) solar photovoltaic (PV) systems, which is currently the dominant form of small-scale electricity generation close to end-users, known as distributed generation. BTM generation sources generate and supply power directly to the facility they are connected to, whereas utility-scale generation produces power that is then sold into the electrical grid. Power generated by a BTM source that exceeds the electricity demand of the facility it is connected to can also be fed into the electrical grid. These capabilities of BTM PV and distributed generation in general provide benefits such as improved electric system flexibility, which lessens a BTM generator's reliance on power from the electrical grid and vulnerability to power blackouts.[33] Additionally, distributed generation benefits grid power stability and lessens power line overloading and energy losses through the transmission and distribution of electricity.[34]

As of 2018, BTM PV in the state was estimated to be 13,582 GWh, which was a 20% increase from 2017.[35] In SCE territory, BTM PV was estimated to be 4,489 GWh in 2018, continuing a trend of steep increases in BTM PV since 2013.[36] SCE mid-level forecast estimates that BTM PV will increase to around 13,700 GWh by 2030.[37] With this level of growth, it is important to understand the potential impacts of increased BTM PV from the perspective of a load-serving entity like a CCE.

Many CCEs have acknowledged the benefits of BTM PV by incentivizing increased use. CCEs typically offer better generation compensation rates than local utilities for customers who generate excess electricity through their rooftop solar installations, known as net energy metering (NEM) customers.[38] CCEs located in SCE service territory that offer higher generation compensation rates than SCE include Clean Power Alliance, Apple Valley Choice Energy, San Jacinto Power, and Lancaster Choice Energy. Furthermore, some CCEs have implemented programs to allow multiple customers to benefit from solar generation from a single installation. CCEs have also used Feed-in-Tariff (FIT) programs to allow for customers to generate and sell electricity from solar installations separate from consumption.

Although there are many benefits derived from the increased utilization of BTM PV, there are potential challenges and costs associated with increased distributed generation that CCEs need to be attentive to. First, BTM solar generation, along with utility scale solar, create operational challenges for CCEs and utilities, such as at times providing more power to the grid than can be used and forcing non-solar generation resource to increase production very rapidly in the late afternoon and evening when the sun is setting. However, some CCEs, such as Monterey Bay

[33] The Growth in Community Choice Aggregation: Impacts to California's GRID. *UCLA Luskin Center of Innovation*, p. 30.
[34] Ibid.
[35] California Energy Commission Almanac (2018); https://ww2.energy.ca.gov/almanac/electricity_data/total_system_power.html
[36] California Energy Commission Behind-the-Meter PV Forecast (November 2019), p. 14; https://www.energy.ca.gov/sites/default/files/2019-12/02a%20Konala_BTM%20PV%20Presentation%2011.21.19_0_0.pdf
[37] Ibid.
[38] Ibid.

Community Power, East Bay Community Power, Peninsula Clean Energy, and Silicon Valley Clean Energy, have existing or planned energy programs that help customers with battery storage systems for their solar systems in order to address this issue.

Increased BTM PV may lead to sales losses for CCEs since many BTM generators can generate and consume their own power. BTM PV expansion could also affect the load shapes of CCE customers since BTM PV output may lead to reductions in system load. This situation could be problematic because CCEs would still have to buy a sufficient amount of power to serve electric demand to its customers, known as resource adequacy, but would have a smaller amount of sales to cover their resource adequacy costs. However, because CCEs can set their own rates, they could adapt rates to fit changes in their customers' load shapes if they drastically change. Additionally, while CCEs currently have attractive compensation rates for customers with BTM solar, CCEs may need to reassess these rates in the future if significant numbers of these customers are created. A tipping point may be reached where CCEs would have to weigh appropriate compensation of NEM customers against maintaining their revenue targets.

C. Energy Storage (Batteries)

California has seen increases in energy storage recently due to storage technologies becoming cheaper coupled with policies to encourage its use. The CPUC has approved over 1,533 MW of new storage capacity in the state.[39] California Assembly Bill 2514 (AB 2514) established an energy storage system target of 1,325 MW by 2020 for load-serving entities. CCEs are currently required by regulators to obtain storage capacity equal to one percent of their 2020 peak load by 2024.[40]

The most common type of storage technology used is battery storage. Battery storage systems are frequently paired with solar PV installations to allow extra energy to be stored in the batteries and used when needed, such as in the early evening when electricity demand is still high but solar generation has fallen off or on partly-cloudy days..[41] Currently, CCEs have been enthusiastically contracting with large-scale solar generators who also use battery storage. While solar PV plus battery storage has several important benefits, these systems do have potential costs from the standpoint of a CCE. Specifically, as BTM battery storage systems become more widespread, they can allow a customer with BTM PV to generate almost all of their own energy and use battery storage to store the energy for later use. This situation may potentially lower a customer's need for power and service from the electrical grid. Although most customers will certainly desire access to the electrical grid for back-up power, sizeable decreases in electricity use among customers for CCEs is possible. One potential solution to the decreased electricity usage is the creation of partnerships between CCEs and their customers where the CCE can regulate the output of a customer's battery. This ability would enable a CCE to optimize their power obtainment. No CCEs are currently doing this.

[39] https://www.cpuc.ca.gov/General.aspx?id=3462
[40] The Growth in Community Choice Aggregation: Impacts to California's GRID. *UCLA Luskin Center of Innovation*, p. 32.
[41] The Growth in Community Choice Aggregation: Impacts to California's GRID. *UCLA Luskin Center of Innovation*, p. 32.

4. Governance Options

The Study addressed the four CCE governance options available to Irvine, and accurately described each of their benefits and risks. The four options are:

- Forming a CCE program as a City Enterprise
- Joining an existing CCE program
- Forming a new Joint Powers Authority (JPA) with other nearby jurisdictions (e.g., other cities within Orange County); or
- Partnering with other City CCE programs to share operating costs under formal agreement. ("JPA-light")

Forming a **CCE program as a City Enterprise** allows for the greatest control and flexibility and creates less complicated governance. The City Council serves as the Board authorizing CCE program structure and programs. It can also exert more local control: the City would make all decisions regarding power portfolio content, retail rate designs, utilization of local generation, implementation of customer programs, etc. On the other hand, the City Enterprise model requires City resources to form and operate. A City CCE program also requires special care to protect the City's General Fund from CCE program obligations.

If the City **joins an existing JPA**, the start-up activities are simpler as the organization is already operating. The JPA structure would also add a layer of financial protection to the City's General Fund. However, the overall governance structure and policies would have to be established prior to joining an existing CCE program and could limit the ability of Irvine to influence CCE program actions or reflect Irvine's particular priorities. The existing JPA may also require the City to make a payment towards the initial start-up and operating costs of that CCE program.

Under an Orange County JPA, each city/jurisdiction would likely be a voting board member. Having a more limited board membership keeps governance nimble and locally/regionally focused. The City would have greater input into the JPA voting structure and foundational policies. With similar goals, decisions should be easier to make. An Orange County JPA CCE program would provide the same financial protections as joining an existing CCE program. Depending on the voting structure established by the JPA and the number of participating cities, the amount of local control for Irvine will be reduced relative to the City Enterprise model. In JPA formation, and in particular voting structures, MRW has observed tension between larger cities and smaller ones. If voting is on a one-city-one vote basis, a large city, that makes up the majority of a CCEs load, can feel underrepresented. If the voting shares are weighted by the load of each jurisdiction, smaller cities fear having the CCE controlled by the one or two largest members. This tension would need to be worked through by Irvine and the other founding JPA members.

Lastly, the level of effort to form may be equal to or greater than forming a City Enterprise CCE program, as all of the foundational documents would have to be prepared but with input (and assistance) from other jurisdictions.

The last option would be to form a "**JPA-light**" with other like-minded cities to share operating costs under another formal agreement. An example of this model is the California Clean Choice Energy Authority (CalChoice or CCEA), a JPA of individual city CCE programs, originally started by the City of Lancaster and the City of San Jacinto, that each retain local decision-making control over CCE program operations (power portfolio mix, rates, local generation, and programs) and see net revenue benefits by sharing centralized services such as regulatory monitoring and intervention, legal, power procurement, and billing. The JPA-light model is well suited for small jurisdictions; for example, all of the CalChoice members are modestly sized cities in the Los Angeles region.

The JPA-Light is less well suited to larger cities, such as Irvine, where there are sufficient economies of scale to operate as a stand-alone CCE or be a lead jurisdiction in a full JPA. Irvine's load alone would be greater than all the current CalChoice members combined.

MRW understands that Irvine city leaders are particularly interested in joining with other Orange County jurisdictions to form a new JPA. As noted in the Study, an Irvine-only CCE program would allow the greatest control over policies such as community programs and rates, but it also requires the greatest effort (both at start-up and ongoing) as well as risk to the city. Thus, forming a JPA with similarly situated cities in Orange County would likely provide the best middle path: Irvine would have a meaningful voice in the governance, regional resources could be leveraged, and the city would be better financially insulated, as the JPA would be completely independent of the city's governance and finances.

The two biggest hurdles to forming an Orange County CCE JPA are coordination with other jurisdictions and time. On coordination, MRW understands that Irvine has reached out to neighboring cities concerning forming a JPA. This effort will need to continue but is undoubtedly hampered by the more pressing issues surrounding the COVID-19 outbreak. Thus, JPA formation could roll well into 2021, allowing for a 2023 launch, at best.

A possible path forward is to form a city-only CCE program initially with the intent of having other cities join in via JPA formation. Or, if at least one other jurisdiction is willing to move forward with Irvine, then the two cities form a JPA with the intent of having additional communities join later. If Irvine leads the effort to create the JPA, the city could define the framework for the JPA under which other cities will join.

There are examples of cities following both of these options. Solana Beach, a city in Northern San Diego County, formed a city-only CCA, the Solana Energy Alliance and began in April 2018. In November 2019, Solana Beach joined with the cities of Carlsbad and Del Mar to form the Clean Energy Alliance (CEA) JPA. The JPA filed its Implementation Plan with the state in December 2019 and will begin service as CEA to customers in all three cities in 2021.

A similar example is with Desert Community Energy (DCE), a new CCE provider in western Riverside County. DCE initially planned on launching in the summer of 2018, with three JPA members: Cathedral City, Palm Springs, and Palm Desert. However due to poor market timing, its launch was delayed until April 2020, with only Palm Springs participating in the initial

launch. Cathedral City and Palm Desert are intending to join the CCE program, but in their own time.

Thus, Irvine would need to balance any desire to form a CCE program in 2022 (the earliest possible date) versus having a fully populated JPA at startup, which would likely delay the process at least one year.

5. CCE Programs in California

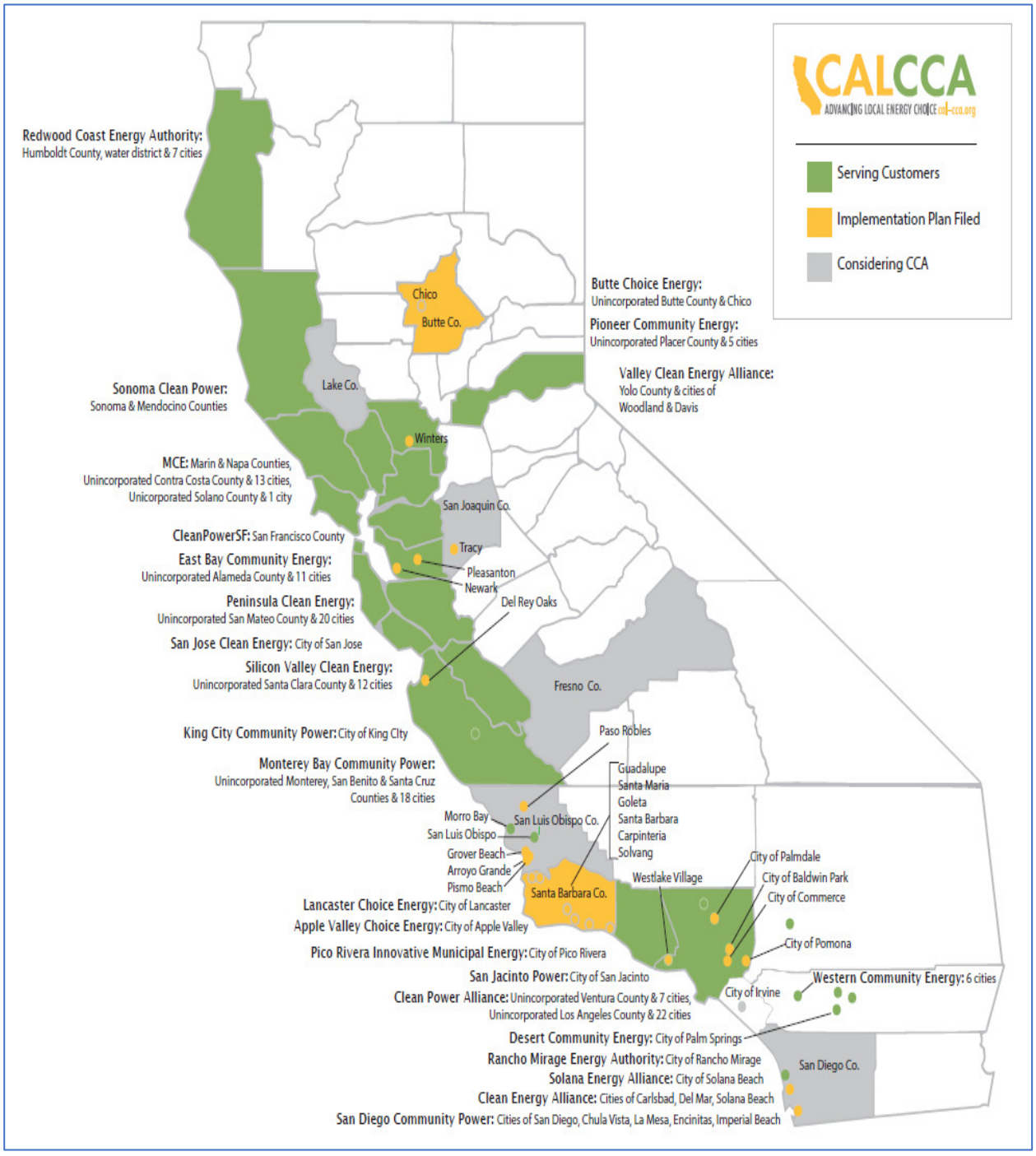
Should the City decide to pursue a CCE program it will not be alone. May 2020 marks the 10-year anniversary of the first CCE program: the Marin Energy Authority, which is now Marin Clean Energy. There are now 21 community choice energy providers serving more than 10 million customers in over 170 cities throughout California. They serve nearly half the retail load in PG&E's territory and are rapidly increasing in both SCE's SDG&E's territory.

A. CCEs in California

Figure 3 on the next page shows communities with active CCE programs or are in some stage of considering joining an existing program or forming one on their own. Note that Irvine is included as a jurisdiction considering CCE. As the figure shows, CCE is currently concentrated on the coast, but inland communities are beginning to consider CCE program formation, too.

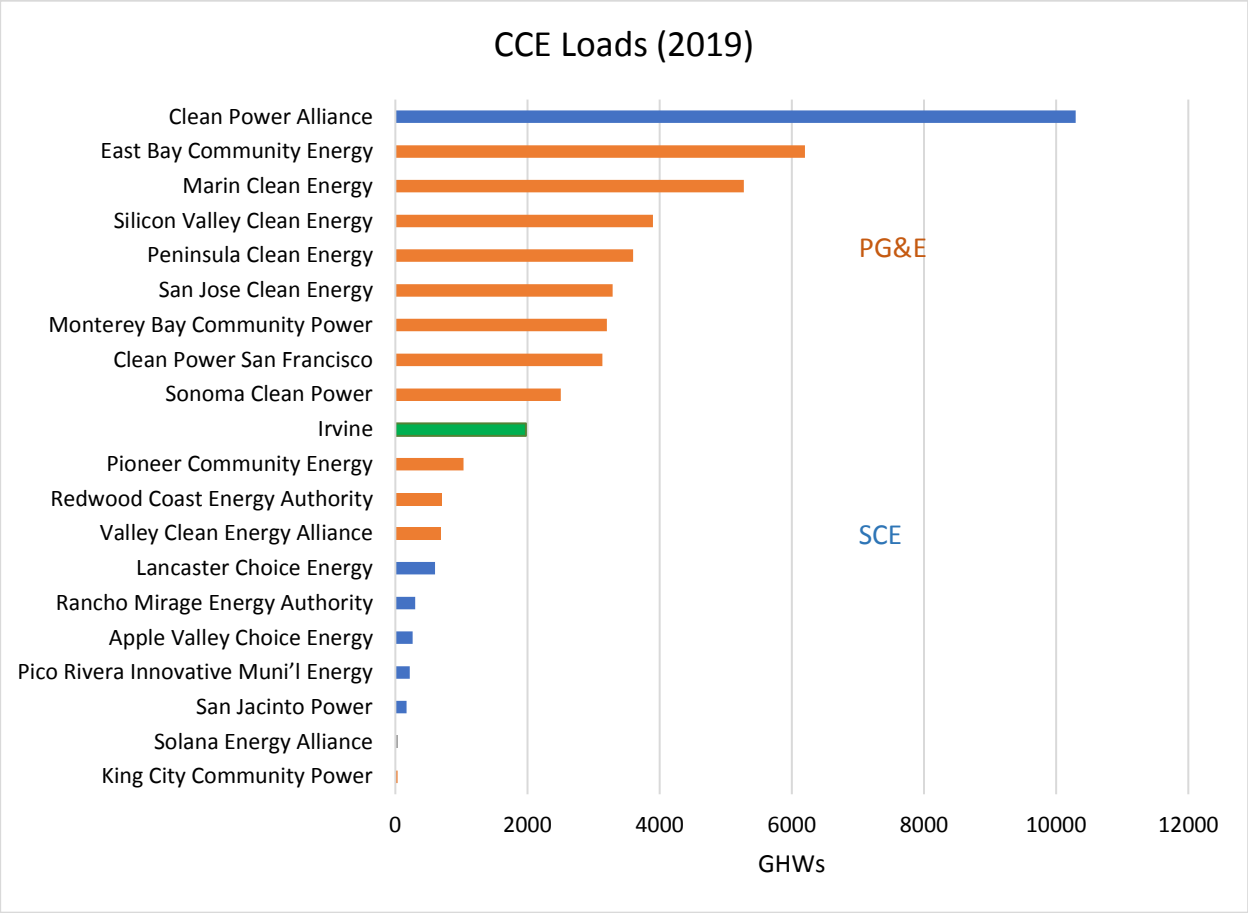
Figure 4 shows the 2019 load for all of the CCEs currently serving load in California. Clean Power Alliance (CPA), the CCA serving Los Angeles and Ventura counties, is by far the largest. If it were a utility it would be the top 70 (by load) in the US. Beyond CPA, the remaining CCEs in SCE territory are small, city-only members of CalChoice. Were Irvine to form a city-only CCE, it would be near the median in size with about half small and half larger.

Figure 3. Communities With Active CCEs or Considering CCE Formation



(Source: CalCCA)

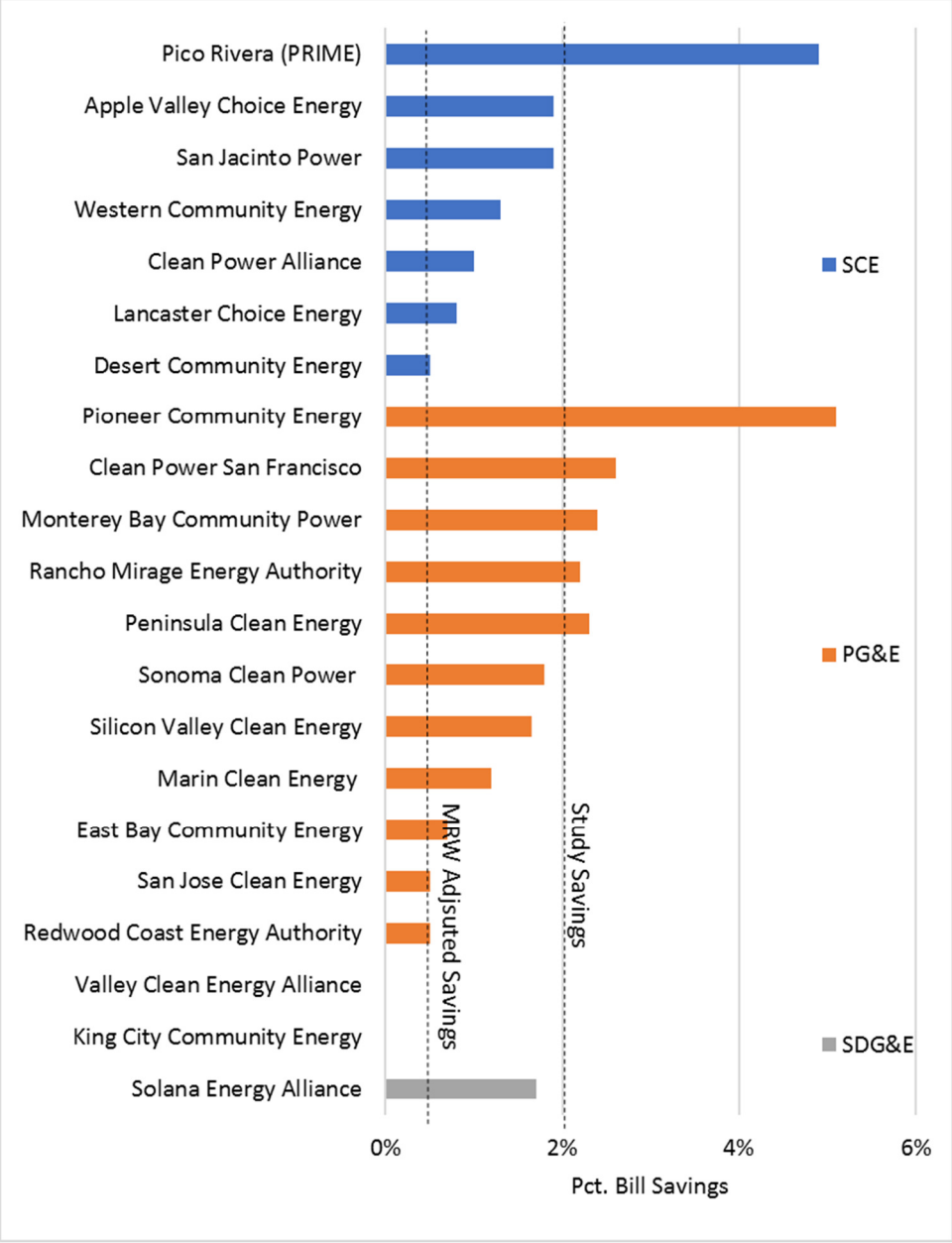
Figure 4. Annual Loads Served By Current CCEs and Irvine's Potential CCE Load



B. CCE Rates

To cross-check the high-level results of the Study, MRW compared the percent rate savings available from the Study, with and without MRW's rate adjustments, to the residential rate savings currently being offered by existing CCAs. This comparison is shown in Figure 5, below. As the figure shows, 13 of 21 CCEs offer residential rate savings between 0.5% and 2% (the range suggested by the Study and MRW), six offer greater rate savings and two offered no savings.

Figure 5. Current (May 2020) CCE Program Residential Rate Savings



C. CCE Experience in California – Lessons Learned

This section draws on MRW's direct experience working for CCE providers and interviews MRW conducted with leaders at seven CCE programs (Clean Power Alliance, Lancaster Choice Energy, California Choice Energy Authority, Redwood Coast Energy Authority, San Diego Community Power, and Silicon Valley Energy) and key players in the California CCE community (Beth Vaughan, Executive Director of the California Community Choice Association (CalCCA),[42] and Shawn Marshall, founder and Executive Director of LEAN Energy US.)[43]

In talking with these CCE leaders, the advice that kept coming up is, "keep foremost in mind why the City is forming a CCE program." The City's leaders must keep that goal in mind throughout the start-up process, both as policies are set as well as in communicating with the public. CCE providers have had the problem of overpromising: "cleaner, greener and cheaper." For example, one CCE provider's preliminary analysis suggested that the CCE could *potentially* offer both GHG savings and a 15% rate savings. But the word "potentially" morphed in the public's mind to "will." And when market conditions changed and the CCE provider could not offer the rate savings the preliminary study suggested might be possible, the CCE's board had to work hard to re-educate its constituents toward more realistic and modest rate savings.

The real benefit of CCE, according to the interviewees, is transparency and local control: CCE programs reflect what the community wants and have the ability to tailor services to the community. One respondent, from Redwood Coast Energy Authority, explicitly said that his proudest accomplishment was successfully integrating many local professionals into his CCE's staff. The respondent for Valley Clean Energy explicitly said that providing local engagement in energy issues was his proudest accomplishment.

Echoing what MRW noted in the Risk section, the CCE leaders interviewed emphasized the uncertainty and changes to the resource adequacy compliance program, PCIA volatility, and market uncertainty around the impacts of the COVID-19 crisis. When asked "what keeps you up at night," the universal response was what might happen at the CPUC (i.e., regulatory risk), especially with the PCIA and RA compliance. This is particularly telling given that the interviews occurred well into the COVID-19 crisis. They feel that the CPUC does not understand

[42] CalCCA is a trade association of active CCE programs and jurisdictions contemplating CCE program formation, Its mission is to create a legislative and regulatory environment that supports the development and long-term sustainability of locally run Community Choice Aggregation electricity providers in California.

[43] LEAN Energy US (Local Energy Aggregation Network) is a non-profit dedicated to the accelerated expansion and competitive success of clean energy CCA nationwide. Ms. Marshall's recent work has focused in California where she has been involved in the creation of several operational CCEs. In 2006, Ms. Marshall served on the task force that ultimately became Marin Clean Energy. From 2009-2012, she served on MCE's Founding Board as its Vice Chair. In addition to her work in the CCA field, she served two terms on the Mill Valley City Council, as Mayor in 2008 and Vice Mayor in 2013.

or appreciate the internal structures and oversights provided by CCEs and feel that the CPUC is treating them like a profit-motivated investor owned utility.

If the goal of CCE formation is rate savings, then multiple interviewees suggested that Irvine should consider deferring CCE until power markets and state policies are more stable and favorable. That is, hold off on plans to launch in 2022 and aim for 2023.

If the goal is to provide better and more innovating services to its residents and businesses, then there are good examples of CCEs positively impacting their communities and therefore moving forward is more reasonable. Appendix 2 shows a matrix of California CCE programs and the programs that they are pursuing. Some examples of positive CCE programs that MRW has seen include:

- In response to the Public Safety Power Shutoffs,[44] **Monterey Bay Community Power** is offering revolving credit so that backup power generators can be installed in critical facilities.
- **Lancaster Choice Energy** is installing free public EV chargers at strategic locations, such as its downtown commercial district, so as to not only provide EV charging but to entice shoppers to the area.
- **Silicon Valley Clean Energy's** "Data Hive," a tool that helps make initiating clean energy projects, such as adding solar and storage or installing an EV charger, quicker and easier by providing instant, authorized, and secure access to standardized energy data needed to provide a project quote.
- **Redwood Coast Energy Authority (RCEA)** is partnering with Humboldt State University, PG&E, and the County of Humboldt to build a 7-acre, 2.25 MW solar array and battery energy storage system at the California Redwood Coast – Humboldt County Airport (ACV). This project is being funded by a $5 million grant from the California Energy Commission with $6 million in match funding from RCEA. This system will be the first multi-customer, front-of-the-meter microgrid in Pacific Gas & Electric's area of service.
- **East Bay Community Energy (EBCE)** prepared a Local Development Business Plan, which provides a comprehensive framework for accelerating the development of clean energy assets within Alameda County. The Local Development Business Plan includes a description of how EBCE can contribute to fostering local economic benefits, such as job creation and community energy programs.
- **Sonoma Clean Power** is the lead participant in The Advanced Energy Rebuild (AER) program, which helps homeowners affected by the October 2017 firestorms rebuild energy efficient, sustainable homes. It provides grants from $7,500 to $20,000 for rebuilt homes to be 20% more energy efficient than the building code requires, install all electric appliances, provide sufficient roof structures to allow for solar PV panels, and install solar+battery systems.

Beyond the services, CCE providers are much nimbler and responsive to both power markets and customer needs than SCE or the other utilities. This is due to the combination of the CCE

[44] Where PG&E cuts off the power to large areas so as to prevent sparking a wildfire.

providers having less institutional inertia in the decision-making process than the utilities, being free from CPUC oversight, which tends to slow down any utility actions, and being closer to their customer-constituents.
If the goal is to accelerate GHG emission reductions or help meet the City's future climate action plan goals, then a CCE can be a good fit. All CCE providers in California are at worst meeting the same GHG emissions rates as their incumbent utility, while others offer 100% GHG-free power by default.

With respect to starting up a CCE, the advice is, "do not underestimate the effort needed to launch." In particular, allow plenty of time for communication with not only the community at large but also key interests, such as local environmentalists, community activists, and labor. Aim to have these groups well informed, and ideally on your side, before trying to launch. Also, bring on key personnel (Executive Director, CFO) and key service providers (e.g., bank, legal counsel, power procurement contractor) early in the process (e.g., 9-12 months before targeted launch).

Last, the interviewees agreed that in forming a JPA, it is important that all the members have similar, if not the same, priorities and goals. This is consistent with the City's interest in forming an Orange County JPA. Having strong and divergent opinions on the direction and priorities of the CCE would be counterproductive for all. Some also noted the time required to bring on all the communities—the need for public hearings and input in each jurisdiction, and the drafting and multiple readings required to pass a JPA ordinance.

CCE Responses to COVID-19

CCEs have responded to the COVID-19 epidemic by providing varying services to their impacted customers. CCEs will not return customers to the local utility due to a COVID-related late- or non-payment. CCEs have also increased their efforts to enroll low-income customers in applicable energy discount programs.

Many CCEs have donated money or helped solicit funds for customers and businesses impacted by COVID-19. East Bay Community Energy has contributed more than $1 million to support community relief efforts, solicited donations for large commercial customers, allocated over $300,000 for community grants, and approved $70,000 in grants for local food assistance programs. San Jose Clean Energy has helped set up and solicit more than $31 million in donations to address food insecurity and support small businesses. Valley Clean Energy and Sonoma Clean Power have also donated to local food banks.

Several CCAs have also provided bill relief to customers during the COVID-19 epidemic. Clean Power Alliance has provided $1 million in bill assistance for impacted residential and small business customers, while Monterey Bay Community Power has deferred electric charges by 50% for customers for May and June. Peninsula Clean Energy approved an automatic $100 bill credit for April for approximately 30,000 low-income customers. Silicon Valley Clean Energy is providing bill credits to low-income and small businesses, $500 stipends for contractors upon completion of an online all-electric training program, and $5 million for regional energy resilience projects.

Appendix 1: CCEs in California

CCA	IOU	Type	Formed	Load, GWh[45]
CCEs delivering power in California				
Clean Power San Francisco	PG&E	City	May 2016	3,135
East Bay Community Energy	PG&E	JPA	Jan.2018	6,200
King City Community Power	PG&E	City	July 2018	35
Marin Clean Energy	PG&E	JPA	May 2010	5,275
Monterey Bay Community Power	PG&E	JPA	March 2018	3,202
Peninsula Clean Energy	PG&E	JPA	Oct. 2016	3,600
Pioneer Community Energy	PG&E	JPA	2018	NA
Redwood Coast Energy Authority	PG&E	JPA	May 2017	699
San Jose Clean Energy	PG&E	City	Sept. 2018	3,286
Silicon Valley Clean Energy	PG&E	JPA	April 2017	3,898
Sonoma Clean Power	PG&E	JPA	May 2014	2,502
Valley Clean Energy Alliance	PG&E	JPA	Dec. 2016	682
Clean Power Alliance	SCE	JPA	Feb. 2018	10,295
Apple Valley Choice Energy	SCE	City; CCEA[46]	April 2017	260
Lancaster Choice Energy	SCE	City; CCEA	May 2015	600
Pico Rivera Innovative Muni'l Energy	SCE	City; CCEA	Sept. 2017	220
Rancho Mirage Energy Authority	SCE	City; CCEA	May 2018	300
San Jacinto Power	SCE	City; CCEA	April 2018	170
Desert Community Energy	SCE	JPA	April 2020	1,668
Western Community Energy	SCE	JPA	2020	1,575
Solana Energy Alliance	SDG&E	City	June 2018	37
Planned Launch				
Baldwin Park	SCE	City; CCEA	2020	255
Pomona	SCE	City; CCEA	2020	655
Palmdale	SCE	City; CCEA	2020	655
Hanford	SCE	City; CCEA	TBD	285
Commerce	SCE	City; CCEA	2021	460
San Diego Regional CCA Authority	SDG&E	JPA	2021	6,800
Butte County	PG&E	JPA	2021	1,080
Expansions of Existing CCEs				
Westlake Village	SCE	JPA (CPA)	2020	

[45] 2019 Load (GWh) reported by CalCCA: https://cal-cca.org/cca-impact/
[46] CCEA = CalChoice Energy Authority, the JPA-Light serving small communities in SCE's territory.

CCA	IOU	Type	Formed	Load, GWh[45]
Santa Barbara (City)	SCE	City (CCEA)	2021	
Del Rey Oaks	PG&E	JPA (MBCP[47])	2021	
Arroyo Grande	PG&E	JPA (MBCP)	2021	
Grover Beach	PG&E	JPA (MBCP)	2021	
Paso Robles	PG&E	JPA (MBCP)	2021	
Pismo Beach	PG&E	JPA (MBCP)	2021	
Carpinteria	SCE	JPA (MBCP)	2021	
Goleta	SCE	JPA (MBCP)	2021	
Guadalupe	PG&E	JPA (MBCP)	2021	
Santa Maria	PG&E	JPA (MBCP)	2021	
County of Santa Barbara	PG&E, SCE	JPA (MBCP)	2021	
San Luis Obispo (City)	PG&E	JPA (MBCP)	2021	
Morro Bay	PG&E	JPA (MBCP)	2021	
Drafted ordinances for implementation as soon as 2022				
North San Diego County CCA	SDG&E	JPA	2022	2,750

[47] Monterey Bay Community Power, soon to be renamed Central Coast Community Energy.

Appendix 2: CCE Programs

(Source: CalCCA)

CALCCA ADVANCING LOCAL ENERGY CHOICE	Apple Valley Choice Energy	CleanPowerSF	Clean Power Alliance	East Bay Community Energy	King City Community Power	Lancaster Choice Energy	MCE	Monterey Bay Community Power	Peninsula Clean Energy	Pioneer	PRIME	Rancho Mirage Energy Authority	Redwood Coast Energy Authority	San Jacinto Power	San Jose Clean Energy	Silicon Valley Clean Energy	Solana Energy Alliance	Sonoma Clean Power	Valley Clean Energy
Budget Billing		In dev.				✔													
Battery Storage Rate		In dev.		✔ (pilot)			✔									✔ (Same as PG&E)		In dev.	
Demand Response		✔	✔				In dev.	✔	In dev.							In dev.		✔	✔
EV Rate		✔	✔	✔ (Same as PG&E)		✔	✔	✔	✔		✔		✔		✔ (Same as PG&E)	✔ (Same as PG&E)	✔	✔	✔ (Same as PG&E)
EV Bus Program		✔				✔			✔									✔	
EV Incentives (vehicles and/or charging)						✔	✔	✔	✔				✔		In dev.	✔		✔	In dev.
EV Load Shifting			✔				✔									✔ (pilot)		✔	
Energy Efficiency						✔	✔				In dev.		✔			In dev.		✔	In dev.
Energy Efficiency Data Sharing				✔															
Low-Income & Multifamily EE							✔		In dev.		✔		✔						
Feed-In Tariff		In dev.					✔	In dev.					✔					✔	
Fuel Switching (Electrification)				In dev.			✔	In dev.	In dev.				✔			✔		✔	In dev.
Solar Incentives												✔	✔						
Low-Income Solar Incentives		✔	In dev.	✔			✔	✔	In dev.		✔								

CALCCA ADVANCING LOCAL ENERGY CHOICE	Apple Valley Choice Energy	CleanPowerSF	Clean Power Alliance	East Bay Community Energy	King City Community Power	Lancaster Choice Energy	MCE	Monterey Bay Community Power	Peninsula Clean Energy	Pioneer	PRIME	Rancho Mirage Energy Authority	Redwood Coast Energy Authority	San Jacinto Power	San Jose Clean Energy	Silicon Valley Clean Energy	Solana Energy Alliance	Sonoma Clean Power	Valley Clean Energy
On-Bill Repayment		*In dev.*					✓											*In dev.*	
Education, Outreach, and/or Innovation Grants			✓	✓					✓	*In dev.*						✓		✓	
Customer Load Shifting		✓					✓									*In dev.*		✓	
Microgrid Development						✓		✓					✓						
Citizen Sourcing			✓			✓							✓						
Energy Education in Local Schools		*In dev.*							✓						✓			✓	
Dividend Program								✓											✓
Solar Referral Service			✓																
Solar+Storage on Critical Facilities			*In dev.*	✓			✓		✓				✓			✓		✓	
Advancing Reach Codes				✓					✓							✓		✓	
Advanced Energy Rebuild							✓											✓	
TOU Rates		✓		✓ (Same as PG&E)		✓	✓						✓		✓ (Same as PG&E)	✓ (Same as PG&E)	✓	✓ (Same as PG&E)	✓ (Same as PG&E)
Customer C&I Clean Power Offerings																✓			
Emissions Inventory Support for Member Agencies								✓								✓			