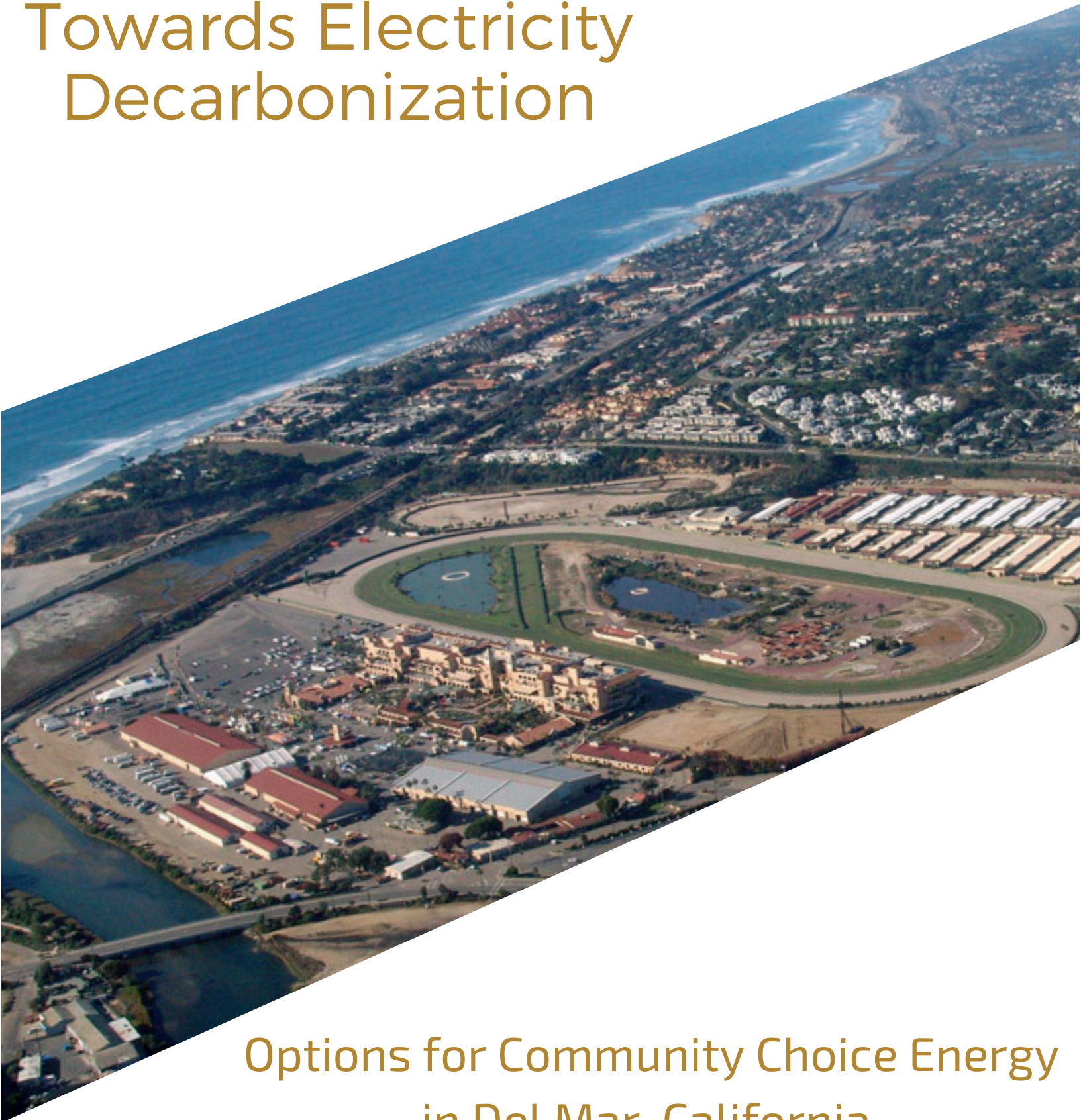


Towards Electricity Decarbonization



Options for Community Choice Energy in Del Mar, California

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Disclaimer

This brief does not necessarily reflect the views or endorsement of the individuals or organizations mentioned above. This brief summarizes many complex issues related to electricity generation and pricing. For the sake of clear communication, some of the more technical details have been simplified or omitted. The scope of this report is to provide accessible, objective and up-to-date information regarding the options for Community Choice Energy programs for Del Mar and the pertinent benefits and risks that might be associated with such a program. Any errors are those of the author.

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Executive Summary

This policy brief summarizes the benefits and risks associated with Community Choice Energy (CCE) –also known as Community Choice Aggregation–programs. CCE programs allow cities, counties or joint powers to pool their electricity demand to purchase power from suppliers directly with the intention of offering customers lower rates and increasing the amount of renewable energy on the grid. CCE has become increasingly popular among Californian cities to introduce competition into the electricity market. Currently, there are nine CCEs in the state that have launched, and by 2020 it is estimated that CCEs will serve nearly 18 million Californians.

The benefits and risks of CCE have been analyzed specifically for the City of Del Mar, a small coastal city in north San Diego County, California to explore their options towards decarbonizing the electricity sector. As part of Del Mar’s Climate Action Goals, the city plans to reach 100% renewable energy by 2035. CCE has been proposed as a tool to reach this goal. This brief found several potential benefits and risks for this program as well as compared two options Del Mar may have to launch a CCE program.

CCE programs’ success rely on offering customer’s competitive rates. Because renewable energy prices are dropping, CCEs can take advantage of this to purchase renewable energy at lower prices than what the Investor-Owned Utility (IOU) can currently offer. While established CCEs across the state have been able to offer competitive rates, they have, and will continue to face, major challenges. These include increasing exit fees, induced competition, IOU opposition, and risk of customer’s opting out to remain with the IOU. These risks can be mitigated by working closely with the IOU, informing and engaging with the community, monitoring critical legislation and advocating for CCE programs.

CCE programs also benefit the community by giving them a voice to choose where their power comes from. Also, the revenue generated from this program can be reinvested into the community and help incubate green innovation. By investing in local projects, jobs are created, boosting the region’s economy. And finally, CCE programs cut greenhouse gas emissions by purchasing more renewable energy from existing sources and investing in new generation.

Del Mar has two options for CCE: forming a Joint Powers Association (JPA) or joining Solana Beach’s CCE in the future. Forming a JPA could take longer to launch, but it would provide a larger, more stable customer base, leading to greater program benefits. However, if planned and managed well, Solana Beach’s fully-outsourced CCE program could be another way to participate in a CCE and might allow for a faster launch. Overall, a JPA option might offer more security in serving the interests of Del Mar and its residents. However, to better quantify the benefits and risks of this type of program, an in-depth technical study would be required.

Introduction

Climate Consensus

For several decades, climate scientists have agreed the body of scientific evidence overwhelmingly supports the idea that humans are affecting global climate. In the latest assessment report published in 2014, the Intergovernmental Panel on Climate Change (IPCC) stated unequivocally that since the 1950s, the earth's temperature has been warming at unprecedented rates, and human-driven emissions of greenhouse gases (GHGs) are extremely likely to have been the dominant cause of the observed warming.¹ The science is also clear that fossil fuel burning is the largest source of anthropogenic GHGs.¹

The effects of climate change are expected to be expansive and expensive, impacting not only the environment but also societies' health, safety, growth and security.¹ Fossil fuels' historic role in the economic and political advancement of nations since the Industrial Revolution is irrefutable. However, an impasse has been reached. If mankind continues to rely upon fossil fuel-based technologies, thereby embedding them deeper within the societal fabric, we ultimately threaten civilization's long-term safety and prosperity. To learn more about climate change and how it threatens society, please see the resources included in Appendix 1a.

Dark Clouds, Silver Linings

Decarbonization, or reducing the GHG emissions from a process, requires moving away from GHG-emitting, conventional fuels towards renewable resources. Ultimately, an energy transformation will be needed to profoundly decarbonize the global economy.² One step will be tackling the GHG emissions from fossil fuel use for electricity production.²



Figure 1: Decarbonization: moving away from GHG-emitting conventional fuels towards renewable energy.

In the United States, the electricity sector accounted for about 30% of 2015 GHG emissions.³ In 2016, it is estimated that 27% of California's electricity was generated from renewable resources.⁴ The state's Renewable Portfolio Standard requires every

energy provider in the state to achieve 33% and 50% renewable energy procurement by 2020 and 2030, respectively.⁵

While this is a step in the right direction, there is room for improvement. Many Californian cities, including Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside (here forth referred to as the Coastal North County Cities (CNCCs)), have acknowledged this and set their own climate action goals.⁶ The CNCCs have each created plans to reach deeper emission reductions and increase their share of renewable energy procurement.

Del Mar's Climate Action Plan (CAP) aims to achieve **50% and 100% renewable energy supply by 2020 and 2035, respectively.**⁷ This goal is critical for reaching Del Mar's emission reduction targets.

Currently, customers in the San Diego area have virtually no choice but to get their power from the local Investor-Owned Utility (IOU), San Diego Gas & Electric (SDG&E). SDG&E's 2015 power mix consisted of 35% renewables⁸, and they have 45% renewable energy contracted for 2020.⁹ While these numbers exceed California's minimum requirements, there is a big gap between what SDG&E plans to provide in the future and what cities like Del Mar need to meet their climate action goals.

Additionally, SDG&E's rates have consistently been some of the highest across the nation, and have increased. After a 10.9% rate increase in January 2017¹⁰, SDG&E recently filed for an additional rate hike for 2018.¹¹ Therefore, an alternative should be developed that can offer more choice, substantially decarbonize the grid, and lower or meet SDG&E's rates.

Assessing a Path Forward

The remainder of this brief will explore one direction Del Mar can go to try and achieve these goals. As mentioned in the Del Mar CAP, Community Choice Energy (CCE) (also known as Community Choice Aggregation (CCA)) is an option for increasing the purchase of renewable energy used for electricity.⁷ The details of CCE programs will be outlined in the following section including its benefits, challenges and uncertainties. Then the options for CCE in Del Mar will be discussed and compared. The information

presented is intended to inform the Del Mar city council and the sustainability advisory board.

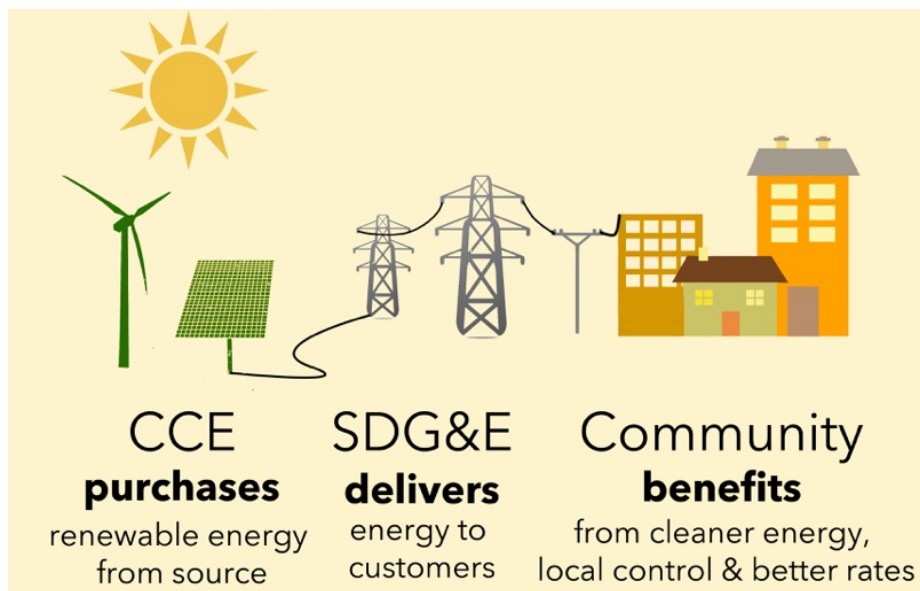


Figure 2: The CCE purchases energy on behalf of the community, SDG&E continues to deliver the electricity, and as a result the community can benefit.

Community Choice Energy

Background

Community Choice Energy (CCE) is a program that allows cities, counties or joint powers to pool their electricity demand and purchase electricity from suppliers directly. CCE programs partner with the incumbent IOU so the IOU continues to transmit and distribute the electricity through their existing infrastructure. Additionally, the IOU remains responsible for line maintenance and billing.

This allows for the purchase of energy from sources that reflect the community's interests and goals. In Del Mar's case, purchases would reflect more renewable energy in the power mix, with the hope of reaching 100% by 2035.⁷

Over the last 7 years, CCE has grown in California, fundamentally changing the structure of the retail electricity market. There are currently nine operational CCEs and

at least three more set to launch in 2017.¹² These programs have introduced competition into the electricity market, providing their customers choice. As of today, over 3.3 million people in California, or about 5% of the energy market, participate in CCE programs.¹³ This number is expected to grow to 17.6 million by 2020 based on existing and planned CCE programs across the state, including the San Diego region.¹³



Figure 3: Map of existing, planned and in progress CCE programs in California. (Data Source: adapted from graphic from DeShazo, Gattaciecceca, & Trumbull.¹²)

Despite the boom in CCE programs, they are still nascent in California. Assembly Bill 117, the legislation that permitted Community Choice in California was passed in 2002¹⁴, but the first program, Marin Clean Energy (MCE), was not launched until 2010. The next was Sonoma Clean Power (SCP), that launched in 2014. After that point, the frequency of CCE launches increased. The most recent program in San Jose gained approval on May 16th, 2017.¹⁵ The evidence of program performance only spans a few years in most cases. However, the information available illuminates the benefits as well as challenges and uncertainties of CCE programs. Relevant resources on CCE are included in Appendix 1b.

Benefits & Risks of CCE

Key Findings



Benefits

- Competitive Rates
- Local Control & Choice
- Incubate Innovation
- Job Creation
- Reduce GHG emissions



Risks

- Exit Fees
- Induced Competition
- IOU Opposition
- Customer Opt-out



Competitive Rates

The CCE program success is highly dependent on the ability to maintain competitive rates with the IOU. Without competitive rates, most customers would opt out, especially those most sensitive to price hikes and those who don't prioritize environmental benefits. The risks to CCE programs primarily relate to their ability to keep rates low and competitive.

CCEs tend to offer two rate plans differing in renewable energy content and price. The "base option" offers an energy mix with a higher percentage of renewables than the IOU, usually between 35% and 75%.¹⁶⁻¹⁹ This option's GHG-free content is typically between 60 and 77%.¹⁶⁻¹⁹

The second option is 100% renewable, GHG-free energy. Based on data from MCE²⁰, SCP²¹, and CleanPowerSF²², about 1-4% of their customers currently choose the 100% renewable energy option. However, community outreach can increase these percentages and CCEs are pushing. Marin Clean Energy is the only CCE to date that offers a third option for 100% renewable energy generated from local solar.²³ For more information about renewable and GHG-free energy, see Appendix 2.

The CCE program's ability to offer lower rates for more renewable energy can be attributed to:

- Flexibility in energy purchases. Unlike the IOU, that may be locked into older, more expensive energy contracts, a CCE can take advantage of new, lower energy prices. Solar and wind have seen massive drops in capital costs, making them competitive at utility-scale with high-efficiency natural gas plants (Figure 4).²⁴ Natural gas prices have also recently hit 20-year lows.²⁴
- Not-for-profit status. Unlike the investor-owned monopoly, the CCE does not forward profits to owners. Since IOUs have a guaranteed rate of return for their investments, there is no real incentive to spend time searching for the best deals. Therefore, taking on pricey projects and purchasing high-cost contracts from merchant distributors does not pose threats to their bottom-line. Any extra costs are passed on to customers through rate increases. Instead, CCEs must compete with the IOU and strive to make the best deals. CCEs also benefit from the ability to use tax-exemptions when financing energy generation projects.²⁵

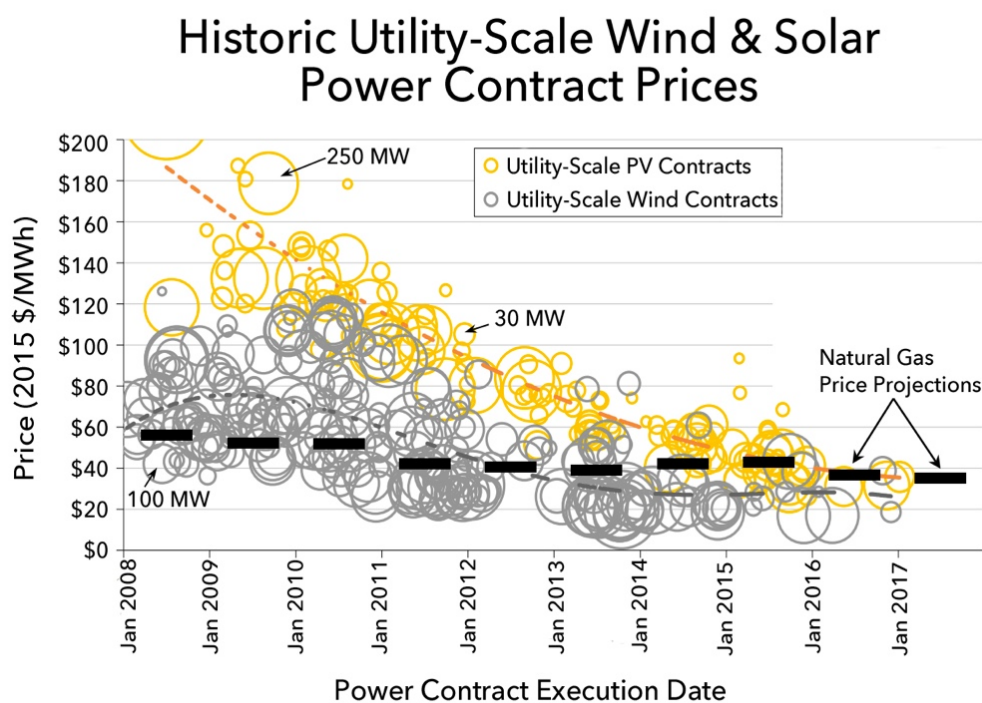


Figure 4: Utility-scale wind and solar PV power purchase contract prices (represented by yellow and grey circles) from 2008 to 2017. The black dashed line represents the Energy Institute of America’s natural gas price projections. Dollar amounts adjusted to 2015 dollars. Wind and solar contracts are becoming increasingly competitive with high-efficiency natural gas plants. (Data Source: adapted from Wisser, Barbose & Bolinger.²⁴)

CCE Rate Trends

Historically, existing CCEs' base option has usually been able to maintain rate parity with the local IOU. Customer's savings tend to start large, around 2-5% when the CCE launches.²³ Figure 5 shows the price trends for Marin Clean Energy's two energy products, the base option, Light Green, and 100% renewable option, Deep Green. Over time, Light Green remains similar in cost to Pacific Gas & Electric (PG&E) but has experienced stretches marked by higher total rates. MCE has been able to offer electricity rates that were cheaper than the local IOU about 70% of the time.²⁹

Table 1 shows current residential rates for MCE, SCP and Peninsula Clean Energy (PCE) compared to PG&E rates. From Table 1, it is evident that each of the three CCEs currently offer 0.27-2.26% savings for their base option and offer 100% renewable energy at 2.3-14% premiums compared to the local IOU's standard mix.

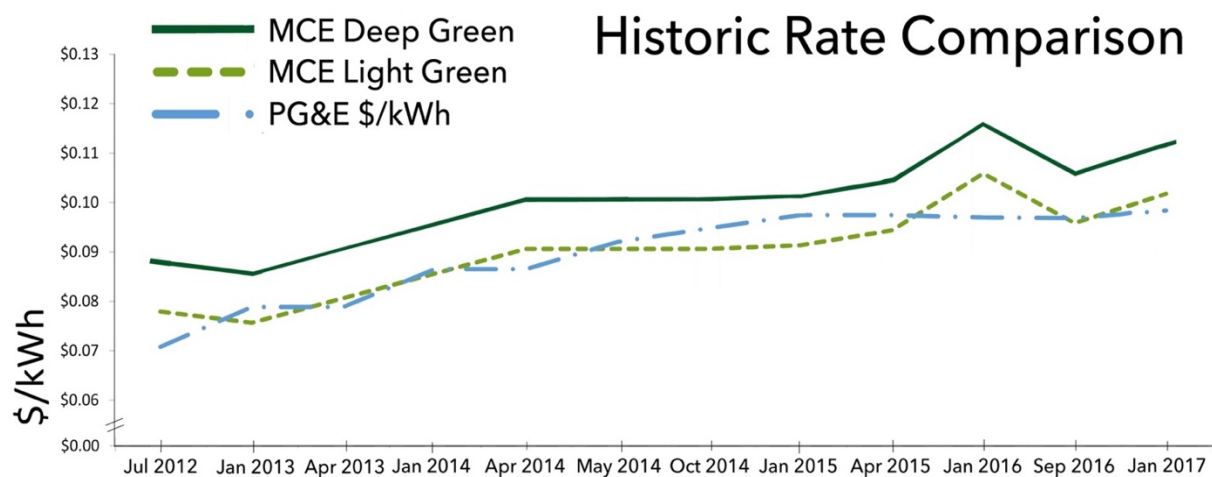


Figure 5: The chart shows MCE's rates for Light Green (base option) and Deep Green (100% renewable option) from mid 2012 to early 2017 in comparison with PG&E's rates. This graphic is not updated to include their newest rate reduction, effective 4/1/17, which brings Light Green rates below PG&E. (Data Source: adapted from MCE's graphic provided upon request.²⁰)

Current Residential Rates							
Program	Marin Clean Energy		Sonoma Clean Power		Peninsula Clean Energy		PG&E
Rate Option	Light Green	Deep Green	CleanStart	EverGreen	EcoPlus	Eco100	Standard Mix
Renewable Energy Content	52%	100%	36%	100%	50%	100%	30%
GHG-Free Energy Content	64%	100%	77%	100%	75%	100%	60%
Total Electricity Rates (¢/kWh)	21.76	22.76	23.42	26.92	21.32	22.32	varies
Cost Normalized by Renewable Content (¢/kWh)	0.42	0.23	0.65	0.27	0.43	0.22	0.78
Rate Difference Compared to PG&E	-0.27%	4.25%	-0.80%	14.0%	-2.26%	2.33%	n/a

Table 1: This table shows key information about three CCE program’s base and 100% renewable options: the amount of renewable and GHG-free energy offered, current rates, and the rate difference compared to PG&E. *This value was derived from dividing the total electricity rate of each rate option by its renewable energy content. †PG&E’s rates varied from 21.82 ¢/kWh for MCE and PCE to 26.92 ¢/kWh for SCP. To calculate total energy rates, the appropriate PG&E rate was used for each CCE based on Cost Calculators and average monthly usage 445 kWh for PCE and MCE customers, and 510 kWh for SCP customers. (Data Sources: MCE²⁶, SCP²⁷, and PCE’s²⁸ Current Cost Calculators based off PG&E’s E-1 rate schedule. Renewable energy content from 2015 Power Content Labels.¹⁶⁻¹⁹)

Based on an average residential customers’ monthly bill, current CCE rates mean **\$0.25 - \$2.25 savings** for the base options and **\$2.25 - \$17 extra** for 100% renewable energy options (see Figure 6).

Despite total rates being higher for 100% renewable energy, CCEs offer a much more efficient way to purchase renewables. When rates are divided, or normalized, by the renewable energy content offered, 100% renewable energy options were about a third the cost of PG&E’s standard mix. Even the base options were about half to three-quarters PG&E’s rates. Overall, CCEs offer more renewable energy for deeply discounted rates compared to the IOU.

Risks to maintaining competitive rates

The ability to maintain competitive rates has and will continue to be challenged by the following:

Exit Fees

Exit fees are often referred to as the largest risk to CCEs’ ability to maintain rate parity. Currently, the Power Charge Indifference Adjustment (PCIA) is the exit fee set by the California Public Utilities Commission (CPUC) that intends to shelter remaining IOU

customers from having to pay more because of CCE customers' departure. Exit fees would apply until all old long-term contracts expire. For the San Diego area, it is likely some form of exit fee will be issued until at least 2041 (the year SDG&E's current lengthiest long-term contract expires).³⁰

The PCIA is set using projected market results, and is never adjusted to account for real market outcomes. If set too high, the fee threatens the ability for a CCE to keep their total electricity rates at or below IOU rates. If set too low, the remaining IOU customers will experience costs shifting onto them.

Given the 211% increase in PG&E's PCIA over the last three years¹², CCEs have criticized the methods for setting the PCIA as being opaque, unjustifiable and intended to hurt CCEs. IOUs have argued, in parallel, that the fees aren't high enough to protect customers that either choose to stay with the IOU or do not have a choice. Establishing a fair exit fee has been difficult, and many argue impossible using the PCIA methodology.

On April 25th, 2017, the California IOUs proposed an alternative to the PCIA. Called the Portfolio Allocation Methodology, or PAM, this would be a new way of assessing exit fees. IOUs argue that the PAM will alleviate cost shifting and result in fairer exit fees. However, many questions remain about how this change would affect CCEs if implemented. Ultimately it will come down to exactly what expenses the utilities include into the PAM calculation. CCEs are currently analyzing the proposed change to determine the risk. Generally, if the IOUs are pushing for the PAM it is likely because exit fees for CCEs would increase, alleviating the alleged inequity to IOU customers.

It is uncertain how large of a risk exit fees, whether the PCIA or PAM, will be for CCEs in the future. However, CCEs would benefit from connecting with existing CCEs to monitor and legislation and regulatory changes and advocate for CCE interests. More information about exit fee risks, please see Appendix 3.

Induced Competition

The pattern of CCE rate savings decreasing after launch has been attributed to increasing PCIA fees as well as the market competition induced by CCE programs. Existing CCEs put pressure on the IOU, and the monopolies have been responding. Some have already begun renegotiating and selling long-term contracts to achieve more competitive generation rates.³¹ This narrows the margin between CCE and IOU

rates and will likely become more of an issue with time as more of the IOU's long-term contracts expire.

This is a risk that is a direct result of injecting competition into the market place, but continually striving to maintain a reliable and flexible energy portfolio that balances environmental goals with the lowest possible costs will help keep CCEs viable.

IOU Opposition

Historically, the local IOU has pushed back against CCEs looking to launch in their territory. CCEs in the Bay Area battled against PG&E's multi-million dollar marketing campaign and influence with the CPUC. Legislation was passed in 2011 to promote fairness by restricting the IOU's ability to lobby against CCEs.³² However, there are still ways that IOUs can oppose CCE programs.

In August 2016, SDG&E filed a request with the CPUC to create an independent lobbying arm, called Sempra Services Corp., that could legally market against CCE programs.³³ SDG&E was the only IOU in the state to do so. The CPUC gave SDG&E approval conditional upon supplying more evidence that Sempra Services was a sufficiently independent entity.³⁴

In December 2016, the CPUC suspended the SDG&E's lobbying arm because of failure to provide sufficient evidence that they were following the rules.³⁴ While under the suspension, Sempra Services met with San Diego officials and made comments on CCE at a County Board of Supervisors meeting in February 2017. This violated the suspension, and is currently being investigated by the CPUC. Currently, it is unclear if SDG&E will face repercussions. In April, the CPUC gave SDG&E's marketing arm full approval.³⁵

Given recent events, there will likely be strong opposition to any CCE started in SDG&E's service territory. CCE programs will likely benefit from launching strong outreach initiatives to educate community members and counteract lobbying efforts from the IOU.

Customer Opt-out

When CCE programs launch, all customers in the service area are automatically opted-

in, but have the choice to opt-out. If competitive rates are not maintained, there is a greater risk of customers opting-out. The higher the opt-out rate, the smaller the customer base and less secure the CCE program becomes.

High-opt out rates can quickly deteriorate the financial stability of the CCE program.³⁶ Not only would customer opt-out lead to lower than anticipated retail margins, but could leave the CCE stuck with excess power. Having to sell extra electricity on the spot market can mean selling it at a loss.³⁶

However, to mitigate this risk, CCEs can plan energy purchases using best available data from existing CCE program's opt-out rates. For example, existing CCE's opt-out rates vary from about 5-18%.^{12,20-22} Having a well-balanced and diversified energy portfolio with a mix of short-term and long-term contracts can keep the program flexible.³⁷ Existing CCEs also suggest strengthening community engagement to prevent opt-out.³⁸

Local Control & Choice

By design, a CCE program should align power purchases and investments with community goals. Not only does this get community-members in touch with the sources of their electricity, but it can also:

- **Advance plans and objectives.** For Del Mar, this would mean choosing to purchase energy from more renewable sources to support their Climate Action Goals. Also, revenue generated through the CCE can be reinvested in additional energy projects and programs.
- **Give customers a choice.** Del Mar's residential, municipal, and commercial electricity customers can choose to get their electricity from CCE or opt-out to receive their power from SDG&E.
- **Promote community engagement.** Opening the decision-making process to the public promotes transparency. It also helps ensure the CCE considers the needs and preferences of community members when setting rates and planning for local energy programs and projects.

Incubate Innovation

The revenue generated from CCE programs can be used to invest in energy generation and storage, and other local programs that support equity, environmental justice, and innovation. CCE's non-profit status allows for capital investment in both supply and demand-side resources.

Local generation reduces reliance on long-distance transmission lines and cuts down on related costs. With lower solar prices and incentives offered by CCEs and government programs, local generation can play an important role in ensuring communities' energy security and improve power quality.³⁹

- **Large-scale local renewable generation.** Local large-scale generation investment helps CCEs diversify, secure and expand their access to renewable energy. Existing CCEs have invested in building large-scale local renewable energy generation (Table 2). In addition to building their own energy projects, these CCEs purchase energy contracts from local generation facilities and invest in the replacement of older less, efficient technologies.⁴⁰ PCE's 20-year contract to build a 200 MW solar farm represents the largest local generation project by a CCE to date.⁴¹ SCP's floating solar project is particularly innovative. The solar installation, the largest project of its type in the United States, will float on top of irrigation water storage ponds. This will supply new renewable energy while reducing water evaporation.¹²

Program	Large-scale Project	Capacity
MCE	"Solar One" Facility	10.5 MW
SCP	Floating Solar Project	12.5 MW
PCE	Solar Farm	200 MW

Table 2: CCE large-scale local generation projects. All currently being built or in planning process. (Data source: DeShazo, Gattaciecceca, & Trumbull)

- **Local distributed generation.** Distributed solar is incentivized by Net Energy Metering (NEM). CCEs offer better NEM compensation rates when customers sell their excess distributed solar energy back to the grid. In most cases, the compensation rates offered are 2-4 times higher than what the IOUs offer.¹² This has resulted in SCP paying customers \$690,000 last year; similarly, MCE paid their

customers over a million dollars in 2015.¹² The CCEs create better opportunities to bring more clean energy onto the grid by offering superior NEM incentives.

- **Energy-efficiency.** Energy efficiency programs have been created through CCEs to encourage lighting and water conservation. These programs can be combined with the incentives already offered by the local IOU. Programs can be tailored to best serve the community's needs. For example, MCE focuses their energy-efficiency programs to benefit the low-income households and small commercial customers in their service area.¹² As of this year, MCE has provided nearly a half million dollars in rebates and thousands of energy audits.¹² Through their energy-efficiency programs, MCE reports saving nearly 8 million gallons of water.⁴²
- **Accelerating the future of clean technology.** The clean technology sector is rapidly advancing and innovating. For example, up-and-coming innovations like in-home or large-scale battery storage, solar roofing tiles, and electric public transportation⁴³ could all become part of CCE pilot-programs. In fact, Assembly Bill 2514 states that CCEs are to procure storage equal to 1% of their 2020 annual peak load, with installation no later than 2024.⁴⁴ Working with other organization such as CleanTech San Diego⁴⁵, or the well-established Los Angeles CleanTech Incubator (LACI)⁴⁶ could boost these efforts. The versatility and range of opportunities for CCEs to invest in innovative technology to encourage decarbonization allows communities like Del Mar to tailor projects to fit their needs and goals.

Job Creation

Through investments in local generation and innovation, CCEs can boost the local economy. Both short-term and permanent jobs can be created from renewable energy generation projects' construction, operation and maintenance. Other CCEs across the state have been successful in facilitating this growth. MCE reports supporting nearly 2,800 California jobs.

Since the cost of living in the Del Mar area is high, the new jobs created are less likely to be accessed by existing Del Mar residents, however, the jobs created may still be considered local if they are filled by people in the San Diego area. The benefits of these new projects would boost green jobs both locally and on the larger state level.

Decrease GHG Emissions

By purchasing more renewable energy, with emphasis on supporting new generation, CCEs have been able to cut down on GHG emissions and spur deeper decarbonization of the electricity sector.

Within the last twelve months, the combined efforts of established CCEs have resulted in total emission reductions of **600,000 metric tons** of CO₂ equivalents.¹² With current California carbon pricing, this results in over **7.5 million dollars saved**.¹²

Given the projected increase in CCE participation in California, it has been determined that CCE programs could help exceed the state's Renewable Portfolio Standards by four percentage points, bringing the state's power mix up to 37% renewables by 2020.¹²

However, a CCE's ability to decarbonize is dependent on what renewable energy purchases they make. When renewable energy is produced, it creates two energy products. The first is the actual electricity and the second is a Renewable Energy Credit (REC). There are three categories, or "buckets", of renewable energy products available on the market, and they are not all created equal.

- **Bucket 1: In-state renewables.** These renewables are generated in the state and they are delivered with their corresponding REC. This is considered "bundled" because the energy and the credit are attributed to the same purchaser. These are the highest value renewables on the market. California RPS standards require a minimum of 75% of energy provider's renewable energy purchases to be Bucket 1.
- **Bucket 2: "Firmed and shaped" renewables.** This refers to renewable energy that is still considered bundled, but the sources may come from out-of-state facilities or may occasionally be "firmed and shaped" with non-renewable resources to account for renewable energy's intermittency issues during peak demand hours.
- **Bucket 3: Unbundled RECs.** This category is purchased to claim RPS-eligibility for electricity produced by non-renewable sources. Essentially, this equates to "greenwashing" dirtier energy and does not support renewable energy generation in the state.

When accounting for the use of Bucket 3 unbundled RECs, the GHG emissions of a CCE may actually increase compared to the local IOU. For example, it was estimated that Lancaster Choice Energy emits 1% more GHG than their local IOU for the same amount of electricity delivered.¹² Despite displaying larger renewable energy content in their portfolio, a substantial amount comes from Bucket 3 renewables. Regulations are in place to limit their use to a maximum of 10% of energy provider's power portfolio.⁴⁷

Because unbundled RECs are the cheapest form of renewable energy products, it is more common to see CCEs use them in the initial periods of service, and phase out their use as they become financially secure. MCE, for example, launched using larger shares of Bucket 3 renewables, but has since decided to limit them to 3% of their portfolio.¹² Other CCEs, including SCP and PCE, do not purchase Bucket 3 renewables at all.⁴⁸ The ability to balance decarbonization and maintain competitive rates is in the discretion of the CCE. Careful analysis is necessary to determine the ideal energy mix.

SDG&E's High Renewables Option. Currently, SDG&E offers a program called EcoChoice that allows customers to choose to pay a premium for 50, 60, 70, 80, 90 or 100% renewable energy.⁴⁹ Figure 6 shows SDG&E's current EcoChoice monthly rate premiums for each renewable energy percentage offered. Also displayed are the current rate savings and premiums of CCE program's options by their corresponding renewable energy percentages. From this figure, it is apparent that while CCE's offer rate savings for their base options, SDG&E's rates are consistently more than their standard mix.

It is also important to note EcoChoice is a limited program, that accepts opt-ins until its share of the state's Green Tariff Shared Renewables allocation is met or until 2019, whichever comes first.⁵⁰ Currently, information online is unclear about how rates may change for EcoChoice customers in the future, and SDG&E representatives could not provide clarification. EcoChoice is currently supplied by a temporary pool of solar facilities that will be used until new renewable energy generating facilities come online.⁵⁰ These new generation facilities are being built specifically as part of the Green Tariff program.⁵⁰

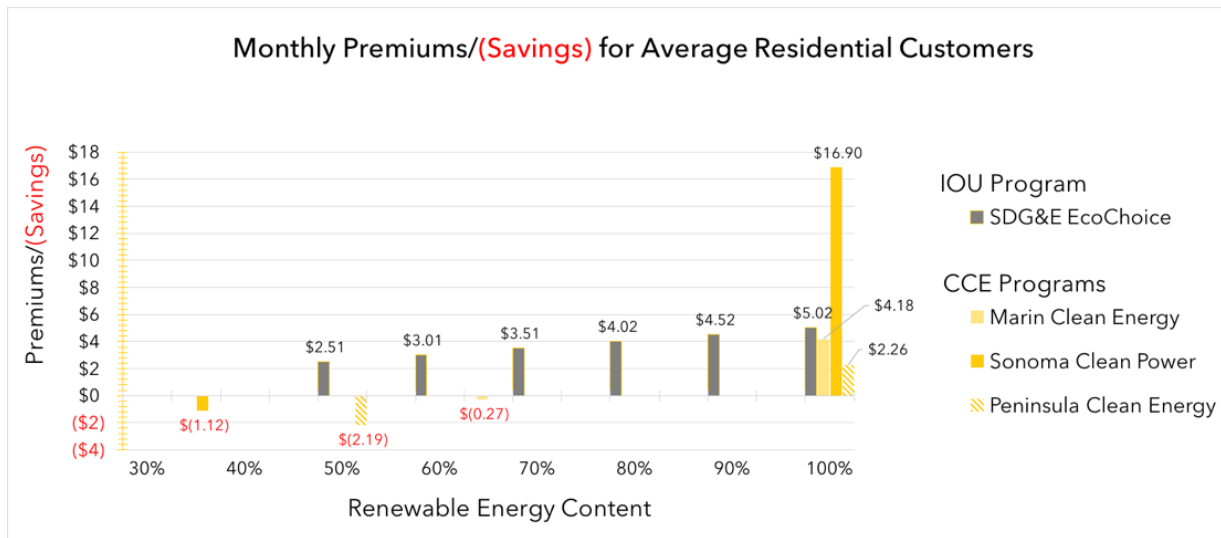


Figure 6: This chart shows the monthly premiums of SDG&E’s EcoChoice program and the premiums or savings associated with three CCE programs across the state. (Data sources: SDG&E EcoChoice Current Cost Calculator based on average SDG&E customer monthly usage of 486 kWh.⁴⁶ MCE²⁶, SCP²⁷, and PCE’s²⁸ Current Cost Calculators based on average monthly residential usage of 445 kWh for PCE and MCE customers, and 510 kWh for SCP customers.)

Improving Quality of Life. Decarbonizing the CCEs’ power mix has broader implications for the Western United State’s most vulnerable populations. By increasing renewable energy purchases, CCEs can lower the purchase of energy from non-renewable sources across the West. Most conventional power plants coincide with areas of higher-risk, lower-income populations.¹² The reduction in local pollution from decreased power-plant emissions may improve air-quality for those who would benefit most.

Options

In Del Mar’s case, the formation of a Joint Power Association (JPA) to run a CCE would be the most likely path forward. The only viable alternative to this would waiting to join another near-by CCE in the future. Since there are currently no CCE’s in the SDG&E service territory, this option is not presently available. However, with Solana Beach moving forward with their turn-key CCE, joining an existing program may soon become an option. The benefits and risks of creating a JPA will be compared to joining Solana Beach’s turn-key CCE.

Option 1: Forming a JPA

Key Findings



Benefits

- Economy of Scale
- Retain Local Control
- Investment Security
- Learning from Experience
- Record of Financial Security



Risks

- Slower to Launch

Forming a JPA, a governance structure already familiar to the CNCCs of San Diego, would be one way to govern a CCE program. First, it is important to verify that the CNCCs would provide a large enough customer base for CCE. Generally, a JPA-run CCE will serve a large number of accounts (around 100,000 or more) because it includes multiple jurisdictions and can benefit from pooling more demand.⁵¹

The number of CNCC households has been used as a proxy for the number of possible electricity accounts. Figure 7 shows the number of households in each jurisdiction. However, it is assumed that Solana Beach will be creating their own CCE and not be participating in the JPA.

2015 Number of Households by Jurisdiction

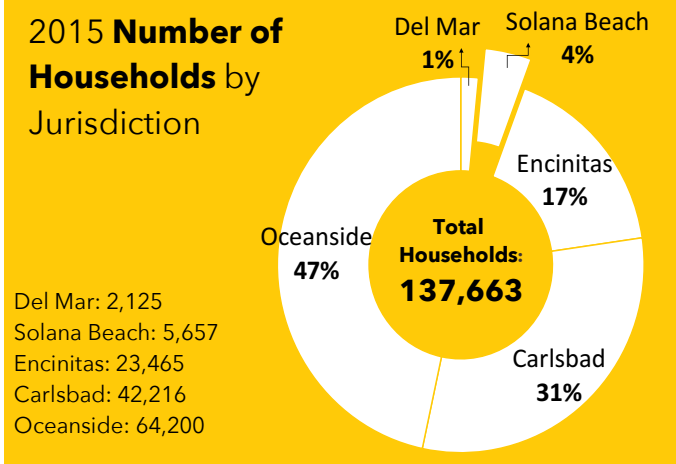


Figure 7: This chart shows the individual and total number of households in the Coastal North County cities. The uncertainty associated with the number of total households is $\pm 4\%$. (Data sources: U.S. Census Bureau's 2015 American Community Survey.⁵²)

Figure 8 shows the total number of households under this probable scenario as well as the possibility of Carlsbad not participating. Applying a conservative opt-out rate of 20% gives the total number of households that would likely participate in either scenario. Since this calculation excludes all non-residential accounts, the actual customer base would be larger. Non-residential customers also use more electricity

monthly, so the aggregate demand would significantly increase once they are factored in. Additionally, the customer base could feasibly increase if other jurisdictions have interest in joining.

+ Economy of Scale

The larger the pool of electricity customers, the better deals a CCE can make on power purchase agreements and other service contracts. By conventional wisdom, a strong base of around 100,000 accounts or more is vital to ensure the program can exploit the economy of buying in bulk.⁵¹ Additionally, this means the program's fixed costs are divided by a larger number of people.⁵³

However, the exact numbers the Coastal North County area required for success would need to be determined through a technical study. While 100,000 is a benchmark, there are examples of programs run successfully with smaller numbers of customers. For example, CleanPowerSF and Lancaster Clean Energy both have customer bases of under 100,000.⁵³ They are both enterprise fund model CCEs, however, which are structured differently from a JPA.

+ Retain Local Control

The JPA's Board of Directors would be formed by representatives of Del Mar and the

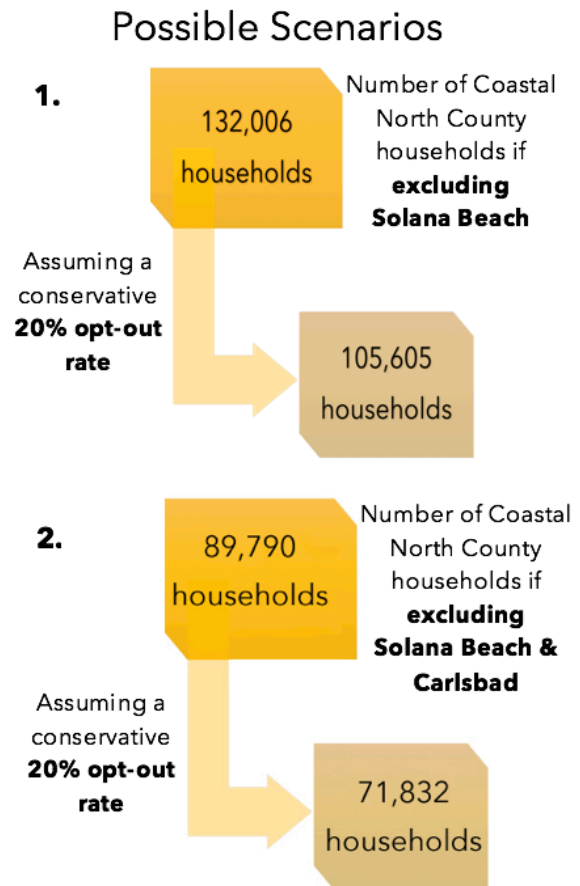


Figure 8: The first possible scenario assumes Solana Beach is proceeding with their own CCE, so total households was recalculated excluding Solana Beach's contribution. The second scenario assumes that neither Solana Beach nor Carlsbad will participate. Applying a 20% opt-out rate, the total number of households in either scenario that can be reasonably expected to participate was calculated. Values have an uncertainty of $\pm 4\%$. (Data sources: U.S. Census Bureau's 2015 American Community Survey.⁵²)

other Coastal North County jurisdiction's that wish to participate. Decisions made by the JPA's Board of Directors reflect each participating jurisdiction's goals and objectives. This ensures that the CCE's revenue and reserves will be reinvested within the community to target specific issues or goals.

Investment Security

JPA's add security to the investment of starting a CCE. Legal firewalls are created between the CCE's potential future liabilities and the jurisdictions' assets.¹² The financial protection a JPA provides to its participating members is one of the main draws because it helps mitigate the risks of CCE.⁵⁴ The entire surplus gained from running a CCE program may be reinvested into other beneficial projects; locking the benefits into the community.

Learning from Experience

Historically, most CCEs in California have used the JPA model, while the rest have used an enterprise fund. The oldest and most well-established programs, MCE and SCP, use JPAs and offer examples for how CCEs can be successfully run. Documents outlining the steps and best practices³⁷ for establishing a CCE have been made available to the public with the hope that other communities looking to set up a CCE program will use the collective knowledge gained to build even stronger programs.

Because MCE and SCP are the oldest programs in California, they have accrued the most information about their JPA-run CCE program's performance. The economic and environmental implications of operating their CCEs can be quantified.

Record of Financial Security

Financial trends from the last three years show the two CCEs grew in total net position, Figure 9, a measure akin to net worth. Continually increasing net position indicates the CCE can provide consistent and reliable service to the community and can contract energy at lower costs and on more favorable terms.⁵⁷

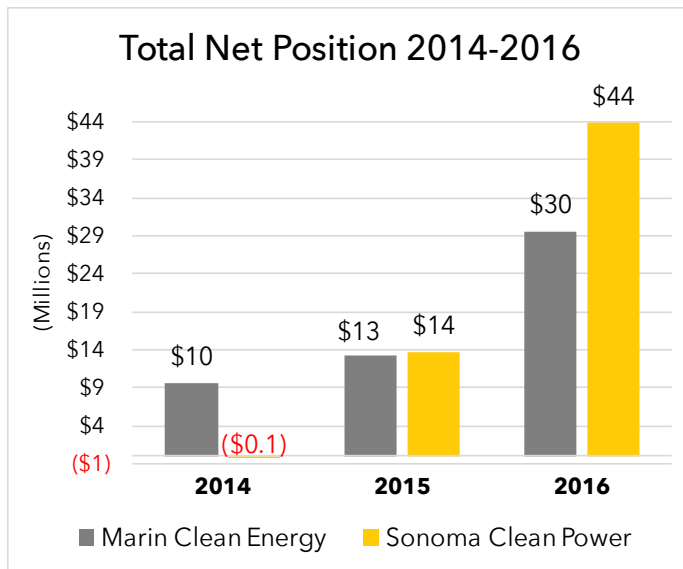


Figure 9: Marin Clean Energy and Sonoma Clean Power’s Total Net Position from 2014 through 2016. Generally, the higher the total net position, the more worth is attributed to that organization. (Data sources: MCE⁵⁵ and SCP’s⁵⁶ 2014, 2015 and 2016 Financial Reports)

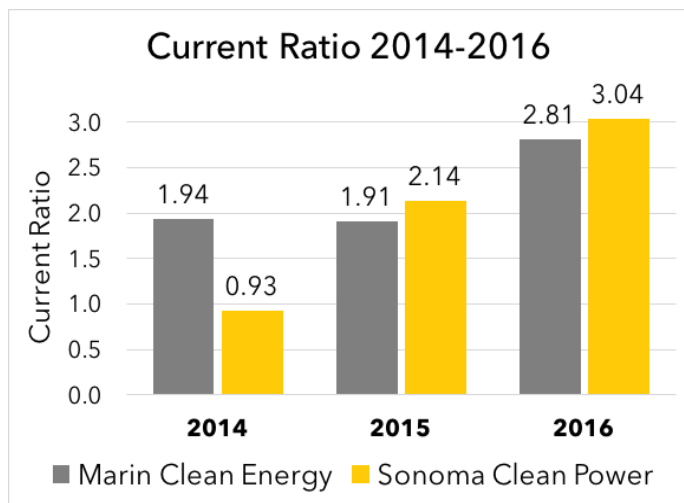


Figure 10: Marin Clean Energy and Sonoma Clean Power’s current asset: current liability ratio from 2014 to 2016. The higher the ratio, the more likely an organization can pay its short-term obligations. (Data sources: MCE⁵⁵ and SCP’s⁵⁶ 2014, 2015 and 2016 Financial Reports)

Additionally, both Sonoma Clean Power’s and Marin Clean Energy’s Current Ratios, the ratio of current assets to current liabilities, has increased from 2014 to 2016 (Figure 10). In 2016, both CCEs had Current Ratios above two. Generally, if the ratio is above this value, it signifies the organization can comfortably and reliably meet short-term financial obligations.⁵⁷

Overall growth for Sonoma Clean Power and Marin Clean Energy is represented in Figure 11 as annual total revenue and total expenses. Both CCE’s expenditures have grown each year, but so have their revenues. In fact, revenues have consistently exceeded expenses. Annual net income has increased each year for both CCEs.

The financial history of these JPA-based CCEs indicate a strong financial future. Financial growth and long-term viability boost confidence in the program, and could allow CCEs to gain credit. Existing CCEs established goals to obtain an investment grade credit score within 5 years of launching⁵⁸. Whether a CCE will be financially stable is undoubtedly influenced by the risks mentioned previously.

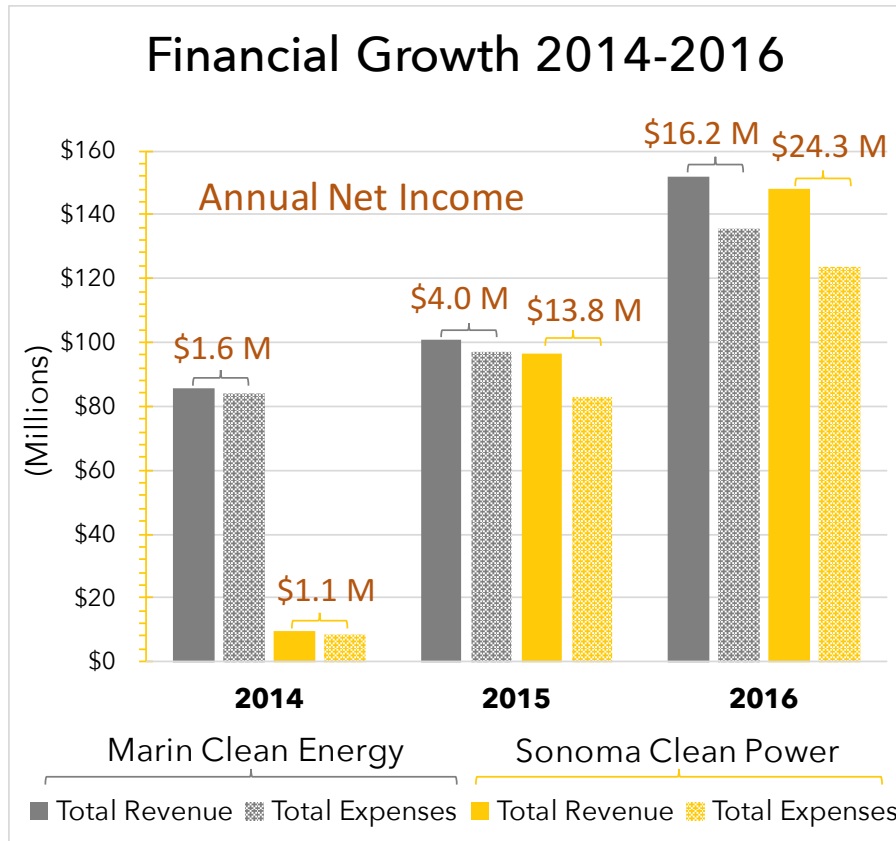


Figure 11: Marin Clean Energy and Sonoma Clean Power’s financial growth from 2014-2016. In orange, the annual net income is also displayed. (Data sources: MCE⁵⁵ and SCP’s⁵⁶ 2014, 2015 and 2016 Financial Reports)

Slower to Launch

The main disadvantage to forming a JPA is that it can take longer to get the program off the ground. This will be impacted by the jurisdiction’s level of commitment and enthusiasm. If proper education and advocacy can be promoted, getting all jurisdictions on the same page, this process can be expedited.

Since Del Mar is already a member of the San Dieguito River Park JPA and the Metro Wastewater JPA it may be possible to create subcommittee or faction within either existing JPA to start a CCE program. In this case, there wouldn’t be the need to start a new JPA, but some cities who may not be existing members of those JPAs would have to join. This could ultimately speed up the process of launching the CCE.

Option 2: Joining Solana Beach



Solana Beach is pursuing a fully-outsourced model. In this model, one or more companies are hired to act as the intermediary between Solana Beach and the energy providers.⁵⁹ However, the City Council still has the final say on all decisions.^{59,60} This approach was generally seen as risky because it had not been used in California. However, after refinement to the fully-outsourced business model, this way of operating CCEs is becoming more attractive to small jurisdictions or those who would like to act alone. For Solana Beach, the planning process for CCE started in 2011, and the decision to launch a CCE using this approach was largely due to other cities within the region not expressing interest in CCE at the time.⁶⁰ Moving forward, as more cities are becoming interested in CCE, Solana Beach would be open to forming a JPA.⁶⁰ There is still considerable uncertainty surrounding this approach which should be considered when reviewing the following information.

Some of the following general benefits and risks have been identified for the fully-outsourced approach. However, as will be made clear, Solana Beach has taken steps to minimize or eliminate these risks.

Faster to Launch

A single jurisdiction can launch a turn-key, fully-outsourced CCE relatively quickly. Because the burden of creating a JPA and sourcing experienced staff is taken up by the company, it makes the CCE program seem like a “lighter lift”. Starting a program faster, in addition to being able to deliver benefits sooner, also sets an example of environmental leadership in the region. Parties looking to establish a partnership with turn-key companies should not be rushed, however, and all details about the

agreement must be clearly and carefully set forth to minimize the following risks. Solana Beach has spent several years planning, but given the regional circumstances, this approach was essentially the only way forward for Solana Beach.

Conflict of Interest

The initial CCE feasibility study done for Solana Beach was completed California Clean Power (CCP), a company that also offered turn-key CCE services. CCP had something to gain if they steered Solana Beach towards the fully-outsourced approach. This risks objectivity and potentially introduces a conflict of interest.

Because Solana Beach wanted to ensure objectivity, they developed and issued a competitive Request for Proposals (RFP) and hired independent consultants to validate the study.⁶⁰ Ultimately, two companies, Calpine and The Energy Authority (TEA), will be working on behalf of Solana Beach. California Clean Power never bid on the RFP after all.⁶⁰ Because Solana Beach took these steps, the risk of a conflict of interest is essentially eliminated.

Misaligned Goals

In other states, for-profit companies operating the CCE usually prioritize lowering electricity rates while maximizing their profits.⁶¹ However, since Californian communities, like Del Mar, have multiple goals they wish to achieve through a CCE program, including making strides towards decarbonizing the electricity sector. This means that, depending on how diligently oversight is conducted, benefits could be lost. To thoroughly perform oversight, the city may be taking on a large time and resource commitment.⁵³ This detracts from the idea that using a company “lightens the lift”. Solana Beach emphasizes the fact that all approaches to CCE will have to outsource some services to other entities, and that all decisions will remain in the hands of the City Council.⁶⁰ Additionally, The Energy Authority, the consulting team selected by Solana Beach, is a non-profit organization. This helps mitigate the risk of misaligned goals.

Risks to Investments

Using a turn-key approach may set up a CCE for less financial security. First, the customer base is much smaller than that of a JPA. Based on Solana Beach's census information, there would be under 6,000 residential households available to participate.⁵² This makes fixed costs more strenuous and decreases the economy of scale substantially.⁵³ Since less revenue will be generated, this lowers the ability to fund innovative and valuable community programs and projects. All the benefits from having a larger customer base would be proportionally reduced.

To mitigate these risks, Solana Beach has set up similar firewalls to the JPA approach to ensure financial security.⁶⁰ However, the risks due to reduced scale would only be mitigated if other jurisdictions join and increase the customer base.

Conclusion

The benefits and risks of CCE are crucial to understanding the potential for this type of program in Del Mar. Among existing CCEs, there has been a record of maintaining rate competitiveness, but not without its challenges.

The biggest risk to keeping prices competitive in the future is expected to be increasing exit fees. However, the competition induced by CCE programs, opposition by SDG&E, and customers opting-out of the CCE all pose risks to offering competitive electricity rates. CCE risks can be mitigated by increasing local outreach and education, developing a working partnership with SDG&E, working with existing CCEs, monitoring related legislation and regulatory changes, and advocating for CCE programs.

Buying renewable energy through a CCE is far more economically efficient than purchasing it through the IOU. Other benefits from CCE programs include providing a voice to the community, investing in innovation, creating jobs, and supporting the decarbonization of the electricity sector.

When comparing possible options for establishing a CCE program in Del Mar, it appears the JPA model would be able to generate the most revenue. The fully-

outsourced model that will be used by Solana Beach has not been launched yet and there is much uncertainty surrounding the benefits and risks of this model. However, with the available information, it appears Solana Beach is committed to mitigating the risks moving forward.

In the future, an in-depth technical study would help quantify the benefits and risks associated with CCE for Del Mar.

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Appendix 1: Resources

A. Resources about Climate Change

NASA Climate Change	https://climate.nasa.gov/evidence/
Climate Central	https://climatecentral.org/
The Climate Reality Project	https://www.climateRealityproject.org/climate-101
The Solutions Project	http://thesolutionsproject.org/
IPCC	http://www.ipcc.ch/
Department of Energy	https://energy.gov/science-innovation/climate-change

B. Resources on CCE

Existing CCE's websites:

Marin Clean Energy	https://www.mcecleanenergy.org/
Sonoma Clean Power	https://sonomacleanpower.org/
Peninsula Clean Energy	https://www.peninsulacleanenergy.com/
Lancaster Choice Energy	http://www.lancasterchoicenergy.com/
CleanPowerSF	http://cleanpowersf.org/
Silicon Valley Clean Energy	https://www.svcleanenergy.org/
Redwood Coast Energy Authority	http://www.redwoodenergy.org/
San Jose Community Energy	http://sanjosecommunityenergy.org/
Apple Valley Choice Energy	http://www.applevalley.org/services/apple-valley-choice-energy

Upcoming CCE's websites:

East Bay Community Energy	http://www.ebce.org/
LA Community Choice Energy	http://green.lacounty.gov/wps/portal/green/lacce
Valley Clean Energy Alliance	http://cityofdavis.org/city-hall/commissions-and-committees/valley-clean-energy-alliance

CCE Advocates

California Community Choice Alliance	http://cal-cca.org/
Climate Action Campaign	https://www.climateactioncampaign.org/
Coastal North County Advocates	http://ccenorthcoastal.org/
Clean Power Exchange	http://cleanpowerexchange.org/
LEANEnergy U.S.	http://www.leanenergyus.org/what-is-cca/

Appendix 2: Renewable and GHG-free Energy

Renewable and GHG-free energy are not completely interchangeable terms. Renewable resources can either be regenerated within a human timescale through natural processes, or are incapable of being depleted.ⁱ GHG-free resources include eligible renewables as well as non-renewable resources. Figure A2-1 shows a list of California's eligible renewable and GHG-free resources.

<u>Renewable Resources</u>	<u>(Non-renewable) GHG-free Resources</u>
<ul style="list-style-type: none">• Solar<ul style="list-style-type: none">Photovoltaics & Concentrating Solar Power• Wind<ul style="list-style-type: none">On & Off-Shore• Geothermal• Biopower<ul style="list-style-type: none">Biogas, biodiesel & biowaste• Small Hydroelectric<ul style="list-style-type: none">Under 40 MW• Ocean<ul style="list-style-type: none">Thermal, wave & tidal current	<ul style="list-style-type: none">• Nuclear• Large Hydroelectric<ul style="list-style-type: none">Over 40 MW

Figure A2-1: Renewable and GHG-free resources based on California's Renewable Portfolio Requirements. (Data source: 2015 California RPS Commission Guidebook)

Despite being considered "GHG-free", some GHG emissions are expected when looking at the full lifecycle of these energy technologies. This usually stems from the production of these technologies. However, because currently these emissions are unavoidable and small compared to conventional fossil fuels, they are granted the label "GHG-free". Figure A2-2 shows the difference between GHG emissions from renewable and non-renewable resources. Renewables emit significantly less over their lifetime.

The two non-renewable, but GHG-free resources are nuclear and large-scale hydroelectric power. Nuclear requires radioactive materials that are not renewable and produces toxic waste products. Large hydroelectric is not considered renewable because it can have negative ecological impacts and is not considered sustainable.

Large hydroelectric has also be attributed to “reservoir emissions”. These unintended emissions occur when newly dammed areas experience biological death and decomposition due to the water’s stagnation, releasing carbon into to atmosphere.ⁱⁱ

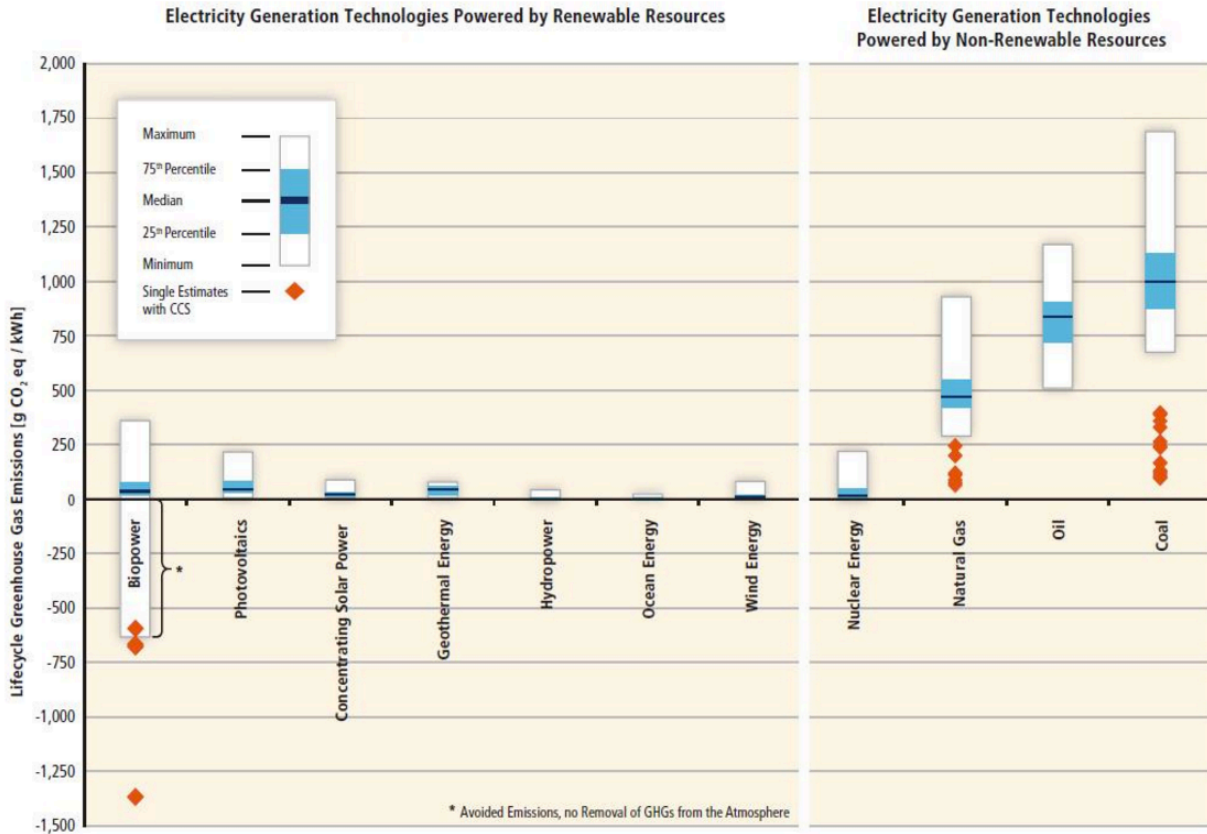


Figure A2-2: This plot shows the expected GHG emissions from various electricity generation technologies. Note: hydroelectric is displayed as a renewable resource, but for California’s RPS only small-scale (less than 40 MW of generation) is considered renewable. (Data Source: IPCC, 2011: IPCC’s Working Group III Special Report on Renewable Energy Sources and Climate Change Mitigation.)

Appendix 3: Information on Exit Fees

Exit fees, often referred to as the largest risk to CCEs' ability to maintain rate parity, are set by the CPUC. Exit fees are intended to prevent cost shifting onto remaining IOU customers in the wake of CCE customers' departure. This is important because it protects IOU customers who do not have the ability to choose their energy provider.

The Power Charge Indifference Adjustment (PCIA) fee will vary depending on the value of the IOU's power purchase agreements made in the past and the current market value of electricity.ⁱⁱⁱ As already mentioned, renewable energy and natural gas have reached historic lows. If the cost of energy remains low or continues to fall, the PCIA will result in a critical fee for CCE customers.

PCIA = IOU's portfolio costs - market value

The 2017 Energy Outlook from the Energy Institute of America (EIA) forecasts that natural gas prices are predicted to increase slightly from 2018-2040.^{iv} However, natural gas prices are highly dependent on the availability of gas and oil and the cost of extraction. Renewable energy will likely experience the fastest and greatest growth because of lower capital costs and state policies encouraging its use.ⁱⁱ Better technology is expected to lead to lower renewable energy prices in the future. Including available federal tax credits, wind and solar units will be among the most competitive sources of new generation in 2022.^{ii,1} If renewable energy prices decrease as projected, the PCIA would likely to remain a burden to CCEs. However, the annual change will be uncertain.

Exit fees are "vintaged" meaning fees are ascribed to departing customers based on the date they leave the IOU's service, so that they are responsible for generation costs incurred on their behalf before their departure to a CCE.^v

To better understand how the PCIA poses a risk to CCEs, Figure 3 diagrams how the PCIA factors into a customer's bill. The transmission and distribution charges do not differ for CCE and the IOU, SDG&E in this example. However, the PCIA charge is only applied to the CCE customer's bills. When added on top of CCE's generation charges,

¹ when levelized costs of electricity and levelized avoided costs of electricity are considered. For more information see:

[https://www.eia.gov/outlooks/aeo/pdf/0383\(2017\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf)

the bill approaches the SDG&E total. To maintain rate parity, the CCE generation charges must remain significantly lower to account for the PCIA fee.

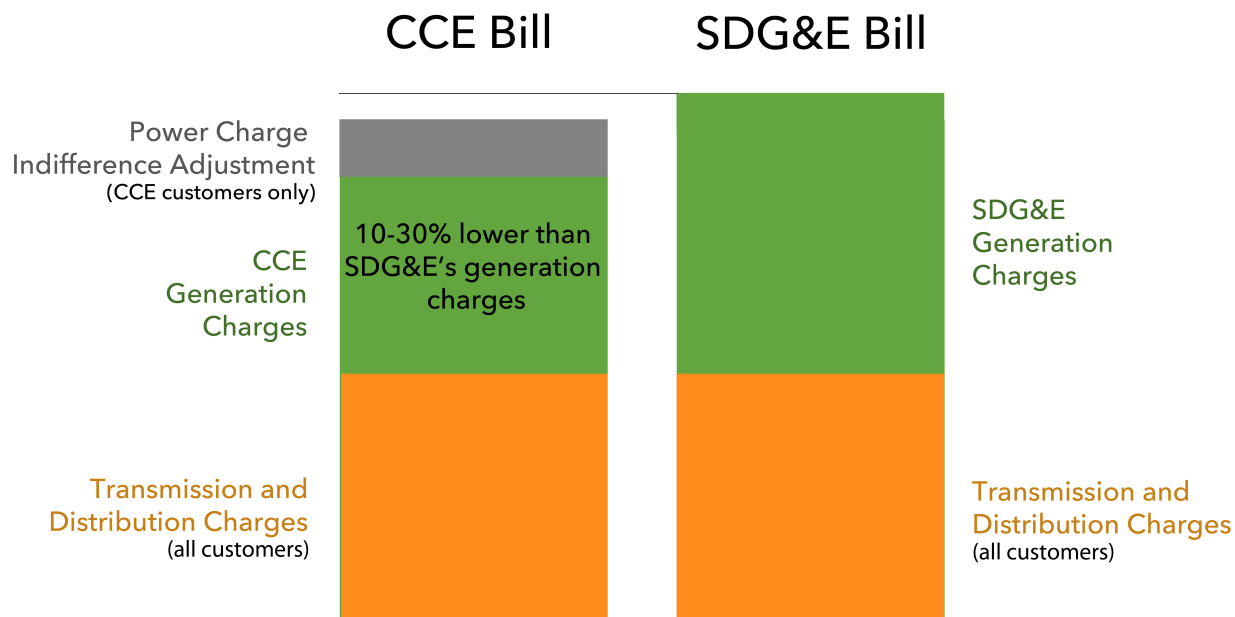


Figure A3-1: Illustrative diagram showing the components of electricity bills for CCE customers compared to SDG&E customers. (Not to scale).

Based on MCE, SCP, and PCE’s data, current generation charges are between 10 and 30% lower than SDG&E’s generation fees. This reflects the CCEs’ ability to get better deals on energy contracts. Based on MCE’s PCIA data from 2015 and 2016, the PCIA constituted 5-15%^{vi} of the CCE customer’s total bill. This translates to MCE customers having paid \$19 million in fees in 2015 and an estimated \$43 million in 2016.ⁱ This reflects 96% and 27% PCIA increases approved in January 2016 and 2017, respectively.

Controversy around this fee stems from the CCE legislation that states IOU’s energy contract costs are only recoverable through the PCIA if they are “unavoidable”.^{vii} Because CCEs must submit binding notices of intent, it has been argued that the IOU should be able to better plan and anticipate customer departures. CCE advocates argue that if the IOUs renegotiate long-term contracts, refuse to extend existing contracts, work to sell off power to others in the market, and plan for smaller customer loads, then the IOU shouldn’t be stranded with more energy than necessary, or at least not enough to impose debilitating PCIA fees.

A spokesperson for SDG&E said the company is “open to renegotiating or selling long-

term contracts to the extent allowed by law, and we have engaged in this practice when there has been an opportunity for us to do so and our customers have benefited from those negotiations.”^{viii} However, currently low transparency in IOU’s power contracts and in how IOU’s justify their PCIA increases make the PCIA unpredictable.

In response, IOUs have proposed an alternative to the PCIA. The Portfolio Allocation Method (PAM) would replace the PCIA and allocate a portion of the IOUs above-market contracts to the CCE.^{ix} While the CCE could use this energy, there is the risk of not needing it and having to sell it on the spot market. However, the PAM would not eliminate the issues with contract transparency. This change will likely require legislative action to establish. While exit fees under the newly proposed PAM are uncertain, it can be concluded that the utilities are pushing this change because it would make CCE customers “pay their fair share.

To mitigate the risks associated with the PCIA/PAM fee, new CCEs can establish clear communication with the local IOU, monitor legislation and the progress of the PAM, and coordinate with other CCE programs to defend fee fairness or spur reform in current policy. Joining the California Community Choice Association (CalCCA), a newly formed advocacy group that defends the interests of CCEs, would offer connections to and support from existing programs.^x

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