DRAFT FOR REVIEW

CITY OF **SAN DIEGO**

FEASIBILITY STUDY

FOR A COMMUNITY CHOICE AGGREGATE

JULY 2017 | FINAL DRAFT

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GLOSSARY & LIST OF ACRONYMS

A

AB	Assembly Bill

B

Baseline	Load allowance used in rate tariffs for San Diego Gas and Electric; refer to Special Condition 3, Sheet 5: http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_DR.pdf
Baseload	The portion of CCA program customers receiving the basic power supply portfolio based on the specific renewable content scenario: 50% for the Base Case Scenario and Scenario 2, 80% for Scenarios 3 and 5, and 100% for Scenario 4.
Bundled Customers	Customers receiving generation, transmission, and distribution services from the incumbent utility.

C

CA	California
CAISO	California Independent System Operator
CalCCA	California Community Choice Association
CAP	City of San Diego Climate Action Plan, Adopted by the City Council on December 15, 2015 by Resolution Number: R-2016-309, Amended by the City Council on July 12, 2016 by Resolution Number R-2016-762 https://www.sandiego.gov/sustainability/climate-action-plan
CARE	California Alternative Rates for Energy
CCA	Community Choice Aggregation
CEC	California Energy Commission
CI	Confidence Interval
City	City of San Diego
COS	Cost of Service
CPP	Critical Peak Pricing
CPUC	California Public Utilities Commission
CRS	Cost Responsibility Surcharge
CTC	Competitive Transition Charge

D

DA	Direct Access—customers receiving energy from an alternative non-Investor Owned Utility supplier.
DAM	Day Ahead Market

DG	Distributed Generation
DR	Demand Response
DSM	Demand Side Management
DWR-BC	Department of Water Resources Bond Charge

E

EDI	Electronic Data Interchange
EE	Energy Efficiency
EIA	Energy Information Administration
EnerNex	EnerNex LLC, consultant retained by the City for purposes of this Study
EPRI	Electric Power Research Institute
ESP	Electric Service Provider excluding Investor Owned Utilities

F

FTE	Full Time Equivalent

G

GHG	Greenhouse Gas
GWh	Gigawatt Hour

I

IMPLAN I/O	IMPLAN Group LLC's Input-Output Multiplier Model
IOU	Investor Owned Utility

J

JEDI	National Renewable Energy Laboratory Jobs and Economic Development Impact Model
JPA	Joint Powers Authority

K

kW	Kilowatts
kWh	Kilowatt Hours

L

LCE	Lancaster Choice Energy
LMP	Locational Marginal Prices
LSE	Load Serving Entity, including Investor Owned Utilities, Electric Service Providers, and CCA programs.
LTPP	Long Term Procurement Plan

M

MMBTU	Million British Thermal Units
MCE	MCE Clean Energy formerly Marin Clean Energy
MCSM	Monte Carlo Simulation Model
MEA	Marin Energy Authority, formed through a Joint Powers Agreement among municipalities which later established MCE Clean Energy
MMT	Millions of Metric Tons
MW	Megawatts, represents power or capacity or demand
MWh	Megawatt Hours, represents electric energy

N

NPV	Net Present Value
NREL	National Renewable Energy Laboratory

O

OASIS	Open Access Same-time Information System
Opt Out	The portion of customers declining to join the Community Choice Aggregation program. Also referred to as opt-out.
Opt Up	The portion of CCA customers selecting 100% renewable portfolio content energy.

P

PCIA	Power Charge Indifference Adjustment
Period	CCA fifteen-year timeline evaluated in the study from 2020 through 2035.
PEV	Plug-in Electric Vehicle
PG&E	Pacific Gas & Electric
POC Report	*Community Choice Energy in the City of San Diego: An Initial Assessment of Program Prospects*, prepared by Protect Our Communities Foundation, September 25, 2015.
PPA	Purchase Power Agreement
PV	Photovoltaic

R

RA	Resource Adequacy
REC	Renewable Energy Certificate or Credit
RPC	Renewable Portfolio Content
RPS	Renewable Portfolio Standard
RTM	Real Time Market

S

SCE	Southern California Edison
Scenarios	Analyses defined for the feasibility study based on levels of renewable energy content in the CCA portfolio: Base Case - 50% renewables for base load customers and 2% opting up to 100% renewable content; Scenario 2 – 50% renewable content for all customers; Scenario 3 – 80% renewable content for all customers; Scenario 4 – 100% renewable content for all customers; and Scenario 5 - 80% renewables for base load customers and 2% opting up to 100% renewable content.
SDG&E	San Diego Gas & Electric, made up of bundled service customers
SEAB	City of San Diego Sustainable Energy Advisory Board
Sensitivity Analyses	What-if evaluation of the impact on study results based on changes in the base assumptions: Sensitivity 1 – 6% increase in SDG&E rates; Sensitivity 2 – 2% decrease in SDG&E rates; Sensitivity 3 – 10% increase in Power Charge Indifference Adjustment; Sensitivity 4 – 2.5 % decrease in Power Charge Indifference Adjustment; Sensitivity 5 – 25% Opt Out Rate, Sensitivity 6 – 15% Opt Out Rate.
State	The State of California
Study	This City of San Diego Community Choice Aggregate Feasibility Study, Final Draft, July 2017.
Study Team	Collectively Willdan Financial Services and EnerNex LLC, consultants retained by the City for purposes of this Study

T

TOU	Time-of-Use

U

UDC	Utility Distribution Company

W

Willdan	Willdan Financial Services, consultant retained by the City for purposes of this Study

EXECUTIVE SUMMARY

Community Choice Aggregation (CCA) is a program for local governments in California (CA or State) to procure electricity supply for, and develop energy resources to serve jurisdictional customers.

According to the Local Government Commission,[i] the most common reasons for forming a CCA program are to:

- Increase use of renewable generation;
- Achieve local control over rate setting;
- Stimulate economic growth; and
- Lower rates.

The City of San Diego (City) seeks to understand the feasibility of CCA for meeting goals and objectives associated with Strategy 2—Clean & Renewable Energy—of the City's Climate Action Plan (CAP).[ii] The CAP strategy calls for achieving 100% renewable energy citywide by 2035. This CCA Feasibility Study (Study) provides in-depth technical, economic, and financial analyses of the potential costs, benefits, and risks of CCA for the City under a variety of future outcomes, or scenarios, over the defined Study period of 2020 to 2035. The Study is intended to provide policy makers, stakeholders, and electricity consumers information for assessing the feasibility of a CCA program for the City. This Study was conducted collaboratively with the City by Willdan Financial Services (Willdan) and EnerNex. Willdan and EnerNex collectively are referred to herein as the "Study team."

This Study evaluates the financial and economic viability of a City CCA program by:

- Forecasting the electricity load requirements and potential customers by class;
- Estimating the costs of procuring the necessary electricity supply;
- Projecting the costs of starting up and administering the CCA program;
- Assessing the level of revenue by rate class necessary to make the CCA program solvent; and
- Evaluating the impacts of changes in Study assumption on the projected feasibility outcomes by running five scenarios based on renewable portfolio content (RPC) and six sensitivity analyses.

The fundamental measure of CCA program feasibility is the advancement of climate action plan goals, cost competitiveness, and economic returns.

The Study enumerates the potential benefits and associated risks of a CCA program and discusses implementation requirements.

[i] Community Choice Aggregation Fact Sheet, funded by the California Energy Commission and Department of Energy prepared by the Local Government Commission. https://www.lgc.org/resources/community-design/lpu/may2015/

[ii] City of San Diego Climate Action Plan, adopted December 2015, amended July 2016. https://www.sandiego.gov/sustainability/climate-action-plan

This Study also considers the City's Sustainable Energy Advisory Board (SEAB) CCA Priority Guiding Principles, included as Appendix B:[iii]

- Model CCA launch as an opt-out program to optimize the purchasing power of the CCA program.
- Consider available information including the third party-sponsored CCA feasibility study funded by the Protect Our Communities Foundation (the POC Report), included as Appendix A.
- Evaluate the economic development potential of CCA.
- Evaluate the ability of CCA to achieve greenhouse gas (GHG) emission reduction targets.
- Evaluate a resource plan that follows the State loading order with an emphasis on local implementation.
- Evaluate the ability to achieve 100% local renewables by 2035.
- Evaluate a business and implementation phase-in plan to achieve targets identified in the SEAB Recommended Minimum Performance Table, included in Appendix B.

Cost competitiveness, GHG reduction, economic benefits, local control, increasing renewable generation, among other considerations, factor into determination of CCA feasibility. The Study team and City staff prioritized feasibility based on the Request for Proposals scope of services, the SEAB Guiding Principles and Criteria, and professional recommendations from the Study team. The Study complied with all SEAB Guiding Principle requirements.

WHAT IS COMMUNITY CHOICE AGGREGATION?

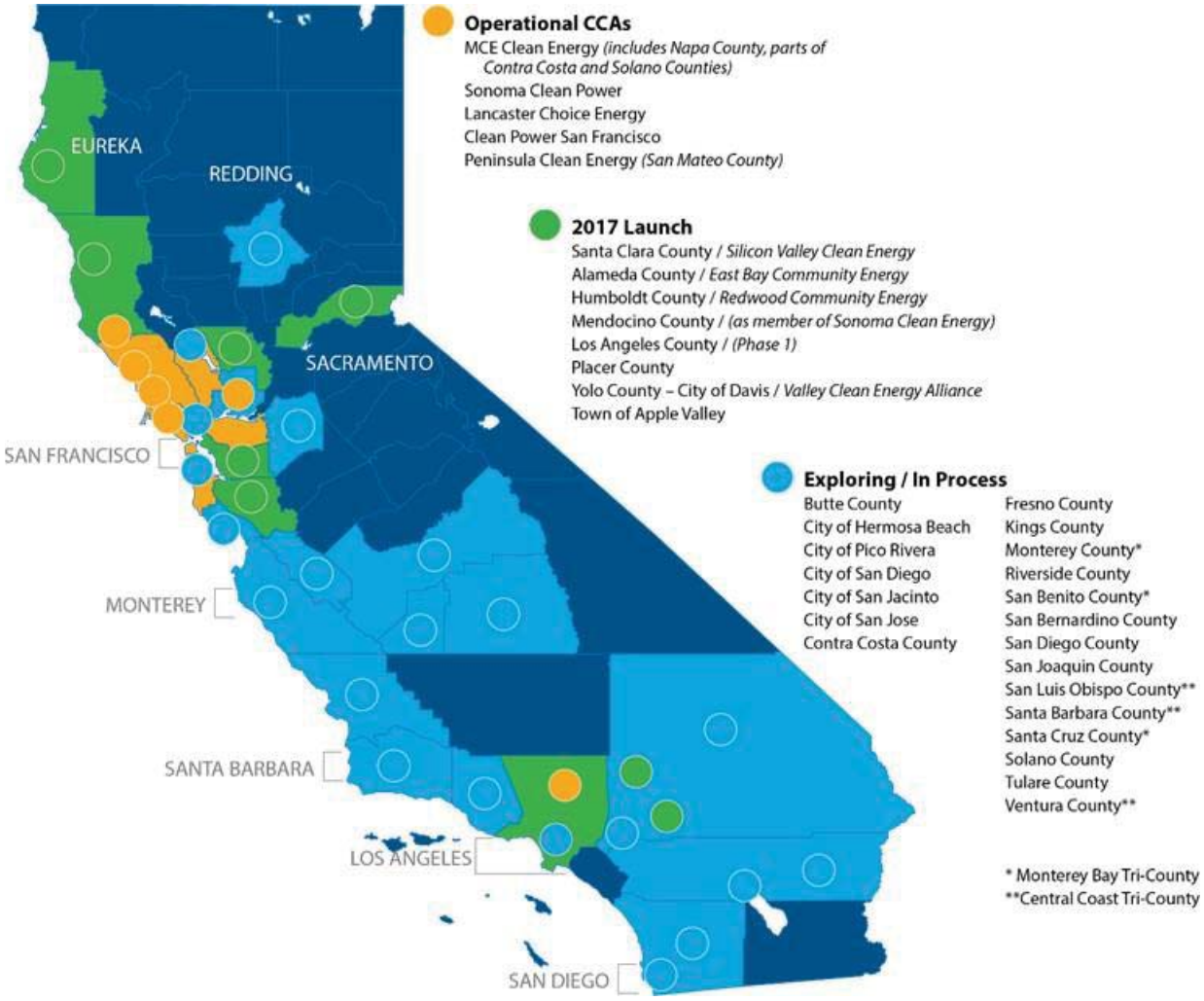
California legislation passed in 2002, Assembly Bill (AB) 117, allows local governments or groups of local governments to procure electricity on behalf of, and develop renewable energy resources to serve, customers within their jurisdictions. With CCA, the local incumbent investor owned utility (IOU) continues to deliver power through its transmission and distribution facilities to customers within its service territory. The IOU also provides monthly customer metering and billing services. The local CCA program procures the electric commodity for its customers, with the intent that the power procured will better meet local governmental goals for sustainability and economic development, among other items, than the power that would have been procured by the local incumbent utility.

COMMUNITY CHOICE AGGREGATION IN CALIFORNIA

Other jurisdictions in California have formed CCA programs in efforts to provide constituents the option to be served with a greater mix of renewable energy generation than is provided by the incumbent utility. Figure ES-1 depicts the status of various CCA initiatives throughout the State and illustrates CCA's broad relevance and priority status for many jurisdictions. As of the date of this report, there are currently eight operational CCA programs, with four more expected to launch in 2018. Approximately twenty other jurisdictions are exploring and/or are in the planning stages for CCA.

[iii] Priority Guiding Principles: City of San Diego Community Choice Aggregation (CCA) Feasibility Study, adopted December 10, 2015 by the City of San Diego Sustainable Energy Advisory Board.
https://www.sandiego.gov/sites/default/files/jan2016seab_cca_guiding_principles_final_adopted_2015-12-10.pdf

Figure ES-1: CCA Status in California[iv]



[iv] Apple Valley Choice Energy and Silicon Valley Clean Energy became operational in April 2017. Redwood Coast Energy Authority became operational in May 2017. Mendocino County became part of Sonoma Clean Power in June 2017. The remaining CCAs scheduled to launch in 2017 appear to be delayed until 2018 as of the date of this report.

SCENARIOS

Working collaboratively, the City and its consultants defined five CCA Scenarios that best capture the range of possible CCA operating outcomes. The City seeks to achieve a goal of a 100% renewable electric supply City wide by 2035. For financial and practical reasons, attainment of this goal cannot be achieved immediately and instead must be phased in over time. The City has the goal of procuring a higher renewable generation content portfolio more quickly relative to San Diego Gas and Electric (SDG&E), its incumbent IOU, and potentially, other competing Electric Service Providers (ESPs). However, the increased cost of renewable energy resources over conventional, natural gas-fired generation resources, may disadvantage the CCA program relative to SDG&E or ESPs. This price disadvantage may endure for a few years or over many years. Based on current industry expectations should: SDG&E and competing ESPs increase renewable portfolio percentages, the CCA program develop additional local renewables, and the cost of renewables decline due to economic factors and technological advances, the CCA program's relative cost competitiveness would be enhanced. Table ES-1 below summarizes the five scenarios defined for the Study based on RPC. The amount of CCA program customers assumed to opt up to 100% RPC, 2%, was chosen based on opt-up rates experienced by other CCAs across the state—notably MCE Clean Energy (MCE) as referenced in its 2017 Integrated Resource Plan.[v] Unless otherwise noted, all Study results reflect the Base Case Scenario.

The Study includes a Base Case Scenario of 50% renewable portfolio content and 2% of customers opting up to 100% renewables. In addition, four Scenarios and six Sensitivity Analyses were evaluated against Base Case Scenario results.

Table ES-1: CCA Program Scenario Definitions for Study

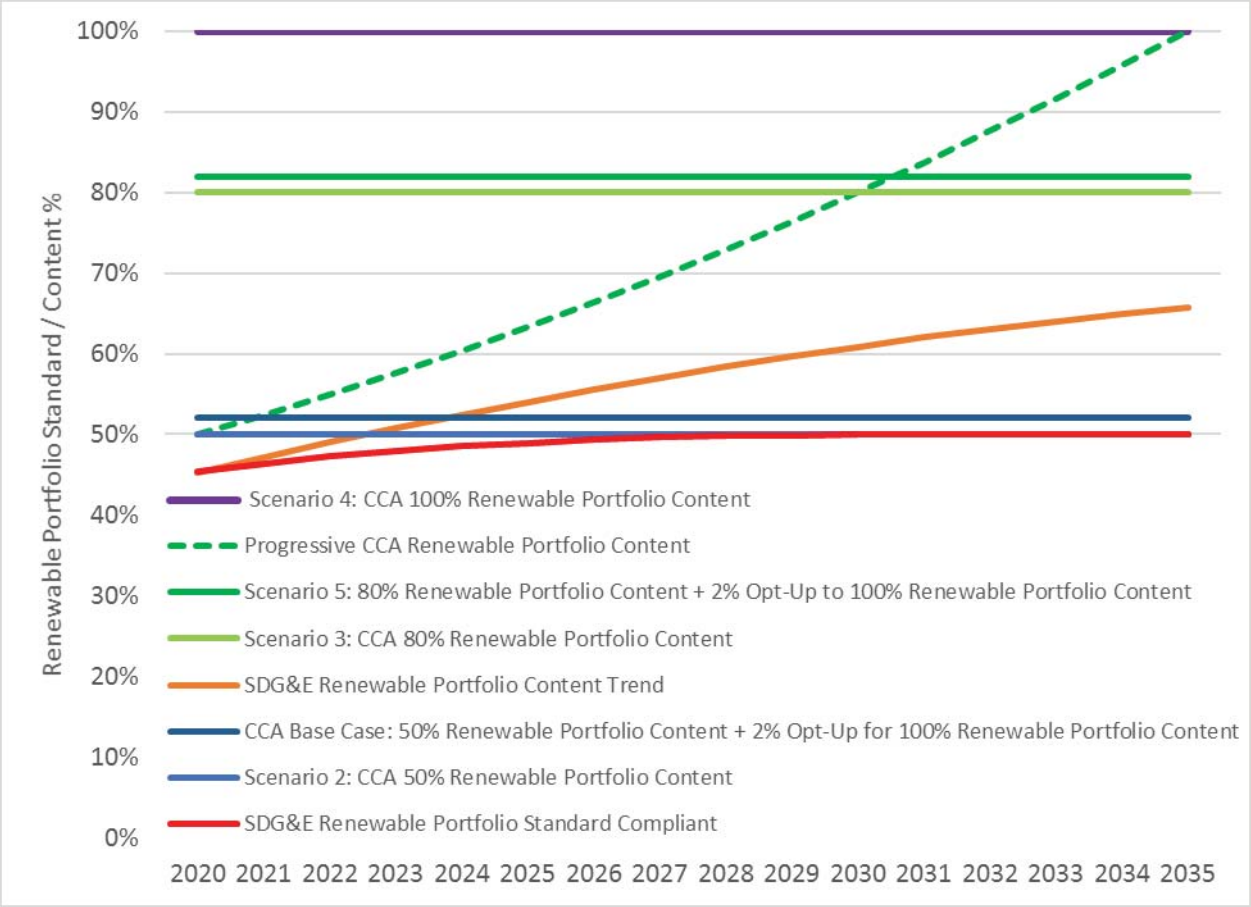
Scenario	Description
Base Case Scenario:	50% Renewable Portfolio Content power supply for 98% of CCA customers with the remaining 2% of CCA customers opting up to the 100% Renewable Portfolio Content optional program
Scenario 2:	50% Renewable Portfolio Content power supply for all customers
Scenario 3:	80% Renewable Portfolio Content power supply for all customers
Scenario 4:	100% Renewable Portfolio Content power supply for all customers
Scenario 5:	80% Renewable Portfolio Content power supply for 98% of CCA customers with the remaining 2% of CCA customers opting up to the 100% Renewable Portfolio Content optional program

Figure ES-2 illustrates the CCA program RPC for Scenarios 2, 3, 4, and 5 over the Study horizon compared to two SDG&E RPC forecasts. The first SDG&E RPC forecast is based on SDG&E complying with the

[v] Refer to: https://www.mcecleanenergy.org/key-documents.

State-mandated Renewable Portfolio Standard (RPS) requirements and attaining 50% by 2030 from its assumed RPC level of 45.2% in 2020.[vi] The second forecast demonstrates the current trend for SDG&E's RPC solely for illustrative purposes; absent increased RPS mandates or other market factors, SDG&E has not indicated that it would exceed the 50% RPS-mandated RPC. A fourth line has been included that models an increasing CCA RPC trend from 50% to 100% over the Study term, labeled the Progressive CCA RPC. The last trend line illustrates how the CCA program could potentially transition to higher levels of RPC over time.

Figure ES-2: Study Renewable Portfolio Content Scenarios v. SDG&E



Working collaboratively, the City and its consultants defined six CCA sensitivity analyses to bound the probable outcomes based on the major risks to the CCA program; these sensitivity analyses were applied to the Base Case. Sensitivities were run against higher and lower SDG&E rate projections, higher and lower levels of the Power Charge Indifference Adjustment (PCIA), and higher and lower opt out rates (i.e., percentage of customers declining to join the CCA program). The PCIA is a fee paid to SDG&E by CCA

[vi] California Public Utilities Commission Renewable Portfolio Standard Homepage accessed March, 2017: http://www.cpuc.ca.gov/RPS_Homepage/

customers to cover potentially stranded costs associated with long term power purchase arrangements to serve departing load. Table ES-2 summarizes the sensitivity analyses.

Table ES-2: Sensitivity Analyses for Study

Sensitivity	Description	Assumption[*]
Sensitivity 1:	High SDG&E Rates	6% increase in SDG&E 2020 rates, annual Base Case escalation plus 6% each year thereafter
Sensitivity 2:	Low SDG&E Rates	2% decrease in SDG&E 2020 rates, annual Base Case escalation less 2% each year thereafter
Sensitivity 3:	High PCIA	10% increase in Power Charge Indifference Adjustment in 2020, annual Base Case escalation plus 10% each year thereafter
Sensitivity 4:	Low PCIA	2.5% decrease in Power Charge Indifference Adjustment in 2020, annual Base Case escalation less 2.5% each year thereafter
Sensitivity 5:	High Opt Out	25% of eligible CCA customers opting out
Sensitivity 6:	Low Opt Out	15% of eligible CCA customers opting out
[*] The 20% of City load served under Direct Access (DA) has been excluded from CCA program load for all scenarios and sensitivity analyses.		

LOAD FORECAST

The fundamental operational role of a CCA is to procure energy and associated energy related services. Forecasting and risk management are primary tasks conducted for power procurement. Power procurement planning and day-to-day decision-making rely heavily on short-term and long-term forecasts of consumer demand for power. The procurement function must also evaluate and assess the inherent risks associated with demand forecasting and develop appropriate risk mitigation strategies. Though no one can predict future energy demand with 100% certainty, logical, data-driven, industry-standard forecasting methodologies are available to provide a realistic outlook of energy demand under a variety of future scenarios.

The fundamental operational role of a CCA is to procure energy and associated energy related services.

CONSUMPTION FORECAST USED IN STUDY

Using data obtained from SDG&E, a normalized forecast of net load by customer account was generated over the Study horizon to provide a basis for projecting CCA program power requirements. Figure ES-3 summarizes usage by customer class over the Study horizon. Actual customer class data was used to determine the patterns of the CCA program's potential customer base, identify the IOU rate tariffs applicable to these classes, and determine the cost recovery requirements for each class. The lower overall load for 2020 and 2021 reflect the phasing of customer enrollment as shown in Figure ES-4.

Figure ES-3: Usage by Customer Class (2020-2035)

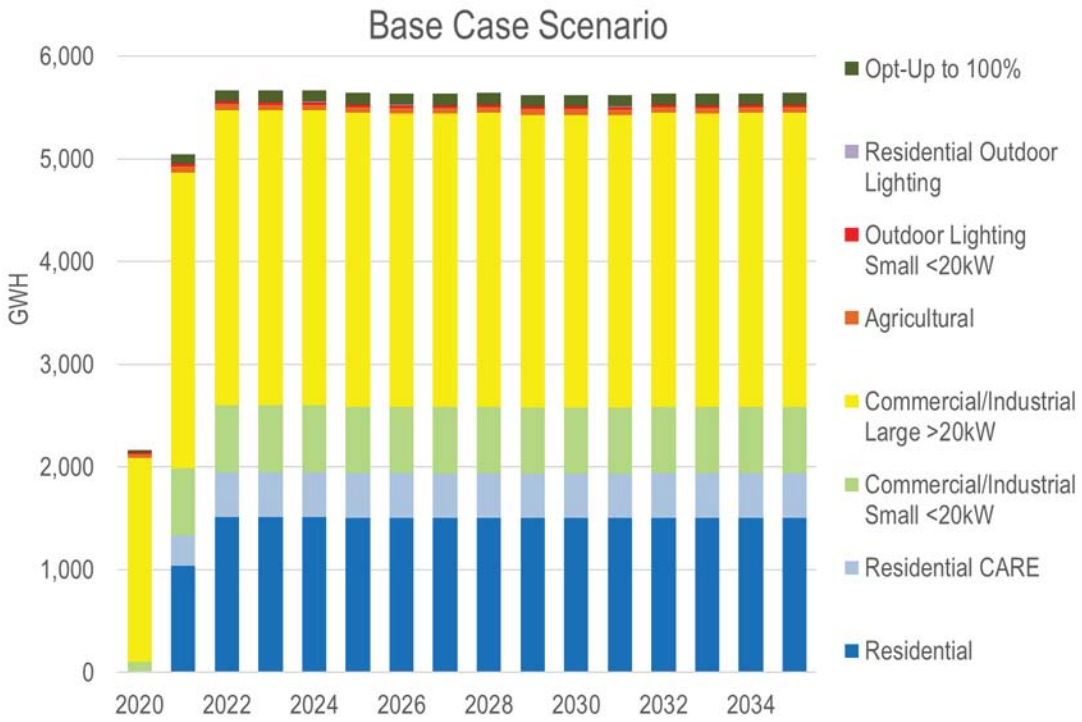
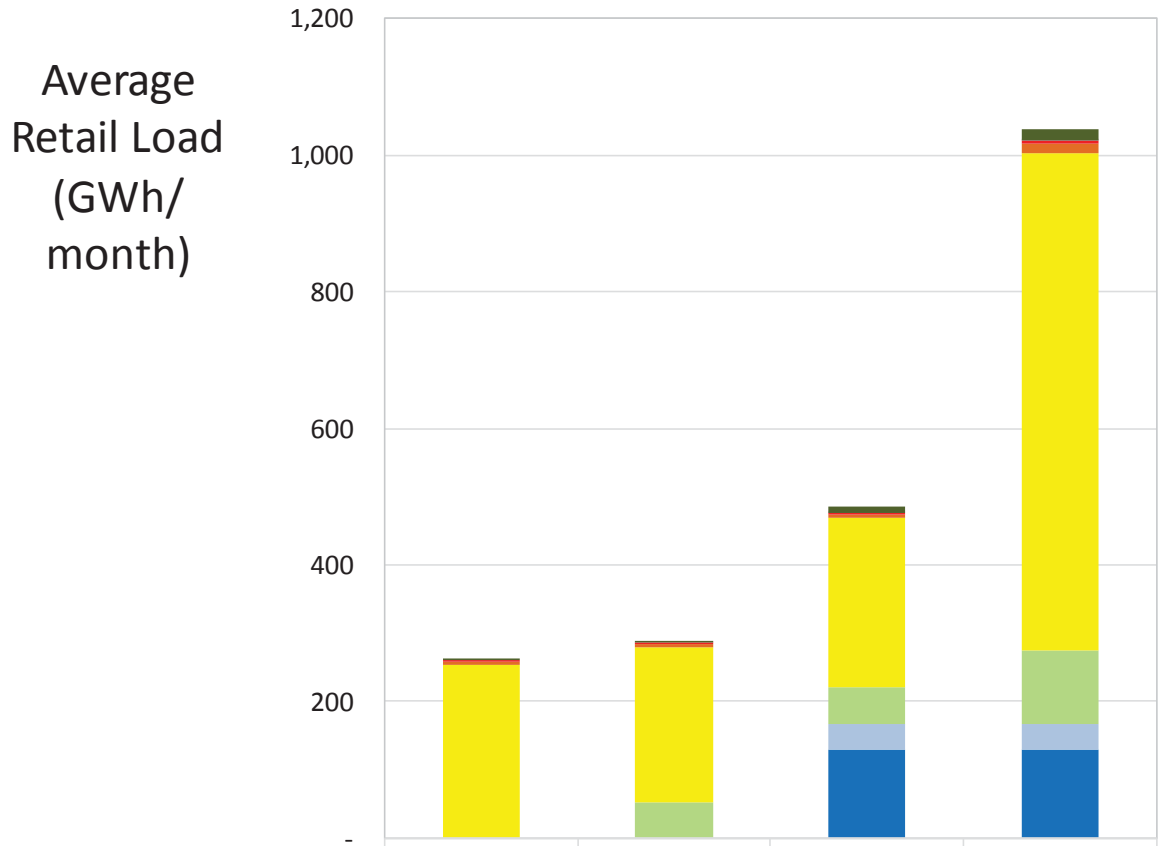


Figure ES-4: CCA Customer Load by Phase



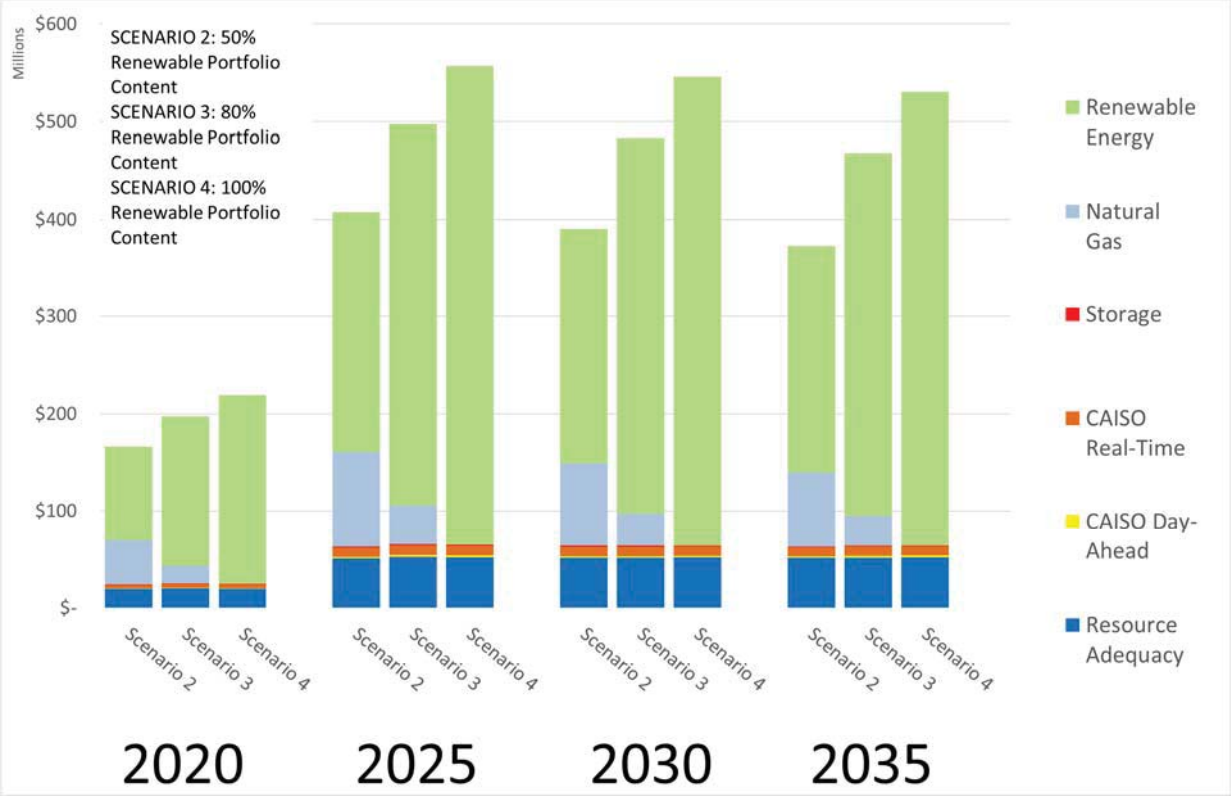
	Phase 1: May 2020	Phase 2: November 2020	Phase 3: May 2021	Total
Opt-up to 100% Renewable, All Classes	2.98	3.61	9.73	16
Residential Outdoor Lighting	-	-	0.15	0
Outdoor Lighting Small <20kW	1.83	2.16	1.90	6
Agricultural	5.27	4.04	5.02	14
Commercial/Industrial Large >20kW	253.16	227.21	247.43	728
Commercial/Industrial Small <20kW	-	52.39	55.13	108
Residential CARE	-	-	37.11	37
Residential	-	-	129.82	130

COST OF POWER SUPPLY BY SCENARIO

Figure ES-5 presents the total cost of power by price component by RPC for Scenarios 2, 3, and 4 for 2020 to 2035. Power costs for the "Base Case Scenario," defined in Table ES-1, are based on replacing 2% of natural gas Purchase Power Agreement (PPA) costs from Scenario 2 with renewable energy priced at Scenario 4 levels. Similarly, Scenario 5 results are based on replacing 2% of natural gas PPA costs from Scenario 3 with renewable energy using Scenario 4 pricing. 2020 results reflect the phasing in of customer enrollment. After full enrollment in year 2021, a general downward trend is evident in the total cost of power for each Scenario over the Study period. This downward trend is driven by the projected decrease

in the costs of natural gas generation, renewable generation, resource adequacy (RA), and storage over the Study horizon. The increase in total power costs related to increasing the amount of renewable generation in the portfolio is also evident by comparing results across scenarios for a given year.

Figure ES-5: Cost of Power by Price Component and Renewable Portfolio Content (2020-2035)



REVENUE REQUIREMENT

The cost of service (COS) analysis relied on traditional utility ratemaking principles and followed an industry standard methodology for creation of a financial pro forma to forecast the future economic and financial performance of the CCA program. The first step in the COS analysis was developing the projected CCA program revenue requirement, the amount of revenues required to cover the costs of the CCA program—including all operating and non-operating expenses, debt-service payments, a contingency allotment, a working capital reserve, and rate stabilization fund. The revenue requirement was based on a comprehensive accounting of all pertinent costs and projections of customer participation. Cost assumptions relied on historical publicly-available information, power cost forecasts conducted for this Study, data provided by SDG&E, and where data was not available, subject matter expertise gained working with a host of public utilities and similar organizations. The COS project team for the Study has over 100 combined years of experience and are industry experts in COS, rate design, and regulatory matters.

Table ES-3 provides test year revenue requirements, by scenarios defined in Table ES-1, for customers receiving the scenario-based RPC energy (Baseload) and for customers opting up to 100% RPC energy (Opt up to 100% RPC). Revenue requirements range from a low of $789 million for the 50% RPC power portfolio (Scenario 2) to a high of $959 million. As would be expected, the highest revenue requirement is associated with Scenario 4, a 100% renewable supply portfolio for all CCA program customers.

Table ES -3: CCA Test Year Revenue Requirements by Scenario

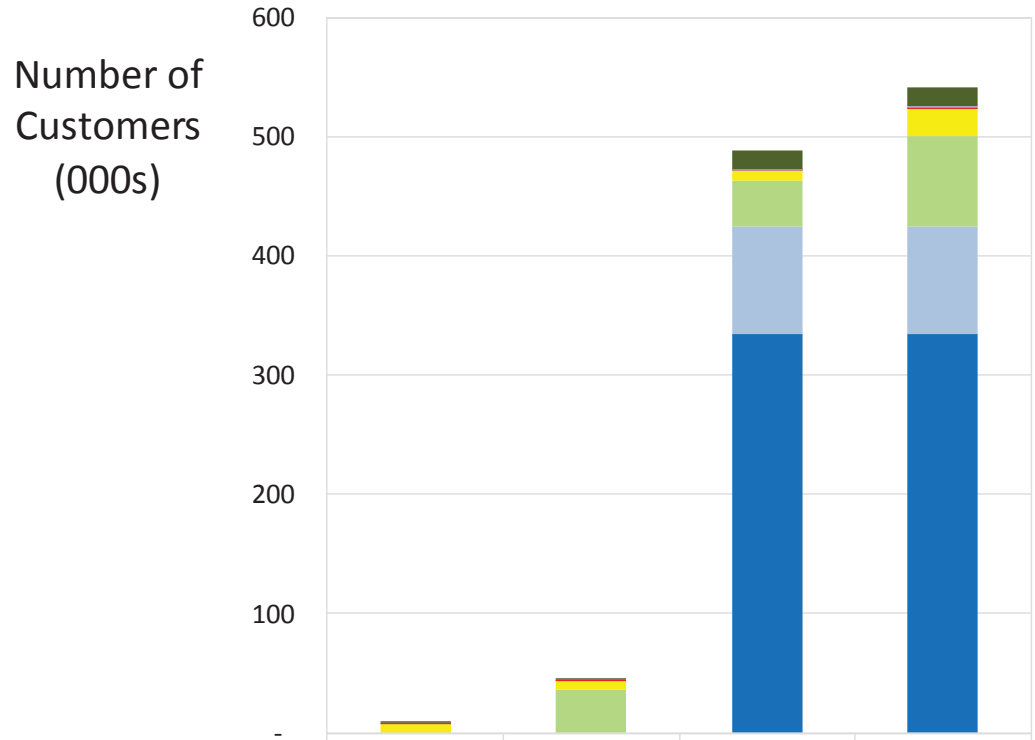
CCA TEST YEAR REVENUE REQUIREMENT	SCENARIO				
	Base Case - 98% at 50% RPC & 2% Opt Up to 100% RPC ($000s)	Scenario 2 - All at 50% RPC ($000s)	Scenario 3 - All at 80% RPC ($000s)	Scenario 4 - All at 100% RPC ($000s)	Scenario 5 - 98% at 80% RPC & 2% Opt Up to 100% RPC ($000s)
Baseload					
Total Operating Expenses Excluding Power Costs	$7,916	$8,082	$8,271	$8,399	$8,098
Total Non-Operating Expenses	24,139	24,535	27,675	29,793	27,158
Power Costs	668,992	683,401	771,828	831,430	755,651
Contingency/Rate Stabilization Fund	$71,682	$72,825	$82,428	$88,901	$80,904
BASELOAD REVENUE REQUIREMENT	$772,728	$788,843	$890,203	$958,522	$871,811
Opt Up to 100% RPC					
Total Operating Expenses Excluding Power Costs	$162	-	-	-	$165
Total Non-Operating Expenses	493	-	-	-	554
Power Costs	16,937	-	-	-	16,934
Contingency/Rate Stabilization Fund	$1,463	-	-	-	$1,651
OPT UP TO 100% RPC REVENUE REQUIREMENT	$19,054	-	-	-	$19,305
TOTAL REVENUE REQUIREMENT	$791,782	$788,843	$890,203	$958,522	$891,116

Key: RPC—Renewable Portfolio Content
Baseload—Customers receiving 50% RPC supply (i.e., 98% of customers)
Opt Up—Customers receiving 100% RPC supply (i.e., 2% of customers)

CUSTOMER PARTICIPATION

Customer CCA program participation was assumed to be constant for all five scenarios and four of the six sensitivity analyses—sensitivities 5 and 6 evaluate the impact of customer opt out rates on results. For all but sensitivities 5 and 6, an opt-out rate of 20% was used for all rate classes for all years, meaning that 20% of bundled customers by load, in each rate class, were assumed to opt out of the CCA program.[vii] Additionally, the 20% of City load served under Direct Access (DA) has been excluded from CCA program load.[viii] As defined in Table ES-2, sensitivity cases were run to examine higher and lower customer opt out levels; customer information for these cases are provided in Exhibit I: Pro Forma Outputs by Scenario.[ix]

Figure ES-6: CCA Customers by Class by Enrollment Phase



	Phase 1: May 2020	Phase 2: November 2020	Phase 3: May 2021	Total
Opt-up to 100% Renewable, All Classes	91	717	15,799	16,607
Residential Outdoor Lighting	-	-	950	950
Outdoor Lighting Small <20kW	304	358	315	977
Agricultural	168	129	160	457
Commercial/Industrial Large >20kW	7,751	6,957	7,576	22,284
Commercial/Industrial Small <20kW	-	36,840	38,771	75,611
Residential CARE	-	-	90,575	90,575
Residential	-	-	334,270	334,270

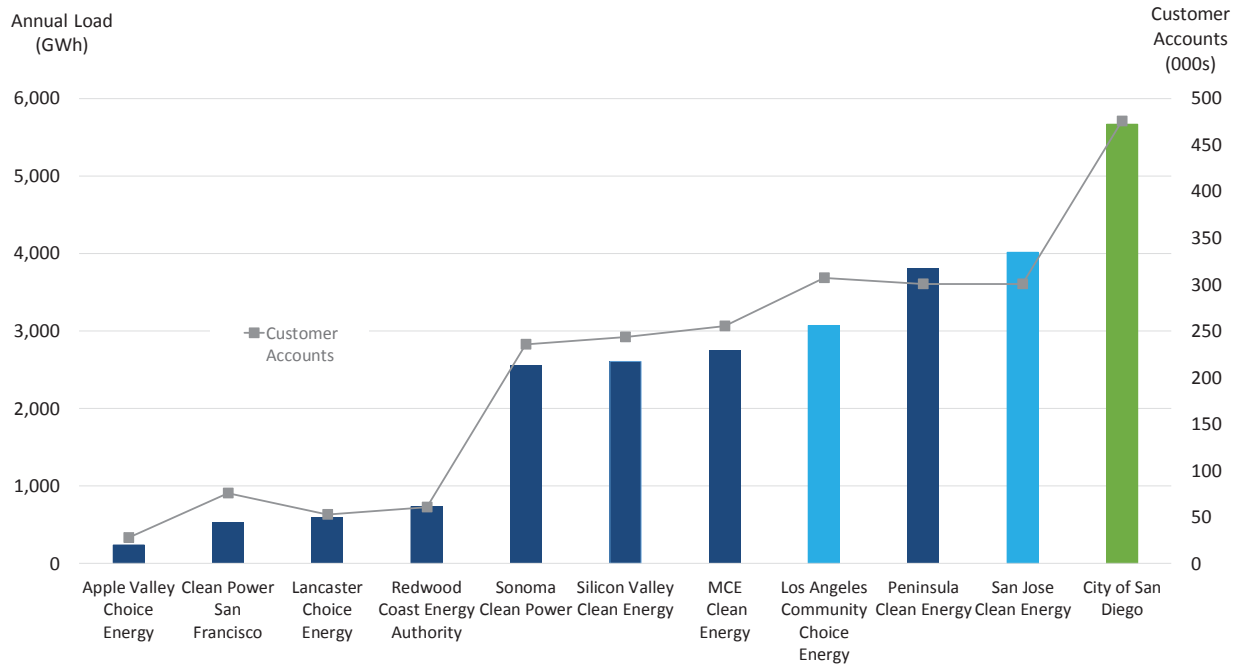
[vii] As discussed in Section I, this 20% is in addition to Direct Access loads that have been excluded from potential CCA load.

[viii] Direct Access customers receive energy from an alternative Electric Service Provider.

[ix] Please see the segment "Opt Out Rates" on page 20 for additional detail.

Figure ES-7 compares the City CCA program's annual load and customer count to eight operating CCAs, including several recently launched, and two larger CCAs—San Jose Clean Energy and Los Angeles Community Choice Energy—which are still in planning stages. As can be seen in this graphic the sheer size of the City CCA would be materially larger than all CCA programs currently in existence. In fact, based on annual load, the City CCA would be over twice the size of all the other operating CCAs, except for Peninsula Clean Energy, and nearly ten times bigger than half of the operating CCAs. The magnitude of this proposed venture could significantly impact operations and risk exposure in ways not yet experienced by other CCA programs. Further, the impact on SDG&E of departing load represented by the City CCA program would be difficult to predict given lack of comparable examples.

Figure ES-7: Relative Size of CCA Programs[x]



BASE CASE RESULTS

Results of the Base Case indicate that by year 2025, for all rate classes except Agricultural, CCA baseload customers (i.e., the 98% of customers receiving 50% RPC power supply) would have all-in rates—total rates including the cost for: CCA generation, IOU transmission, and IOU distribution—that are lower than SDG&E. Table ES-4 presents the Base Case energy commodity rate differences between the CCA

[x] Source: California CCA Quarterly Update April 2017 and as reported in CPUC staff presentation at the Community Choice Aggregation En Banc, February 1, 2017. http://cal-cca.org/wp-content/uploads/2017/01/CalCCA-Quarterly-Update-April-2017.pdf and S. Casazza, Energy Division, FinalStaffEnBancPresentation2.1.17.pptx.; County of Los Angeles Community Choice Energy Business Plan, July 2016. http://file.lacounty.gov/SDSInter/green/247381_BoardMotionofSept152016ItemNo6-FinalReport.pdf; San Jose Clean Energy Feaasibility Study, February 2017. http://www.sanjoseca.gov/DocumentCenter/View/65896

program and SDG&E for the first five years of the Study period for baseload customers. The energy commodity portion of customers' bills, also frequently termed "generation," is where the CCA competes against the incumbent IOU. The delivery and customer charges remain the same between CCA customers and SDG&E bundled customers. Table ES-5 presents the Base Case energy commodity rate differences between the CCA program's rates for those customers opting-up to 100% renewable energy and SDG&E's EcoChoice rates for those customers choosing 100% renewable energy. Through its EcoChoice program, SDG&E offers customers the option to have from 50% to 100% of energy come from renewable sources. Customers choose the amount and pay a premium each month based on the amount of renewable energy selected. Rate information for both Table ES-4 and ES-5 are expressed on a dollar per kilowatt hour (kWh) basis.

Table ES-4: Base Case Scenario Rate Comparison by Customer Class CCA v. SDG&E ($/kWh)

Indicative Comparison 50% Renewable Portfolio Content (Average Monthly Load Above 130% SDG&E Baseline [*])										
	2022		2023		2024		2025		2026	
Rate Class	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates
Agriculture	0.1204	0.1167	0.1204	0.1177	0.1204	0.1188	0.1204	0.1199	0.1204	0.1210
Commercial/Industrial Small <20kW	0.1320	0.1313	0.1320	0.1343	0.1320	0.1374	0.1320	0.1405	0.1320	0.1438
Commercial/Industrial Large >20kW	0.1339	0.1262	0.1339	0.1299	0.1339	0.1338	0.1339	0.1378	0.1339	0.1419
Residential	0.1516	0.1519	0.1516	0.1593	0.1516	0.1670	0.1516	0.1752	0.1516	0.1837
Residential California Alternate Rates for Energy (CARE)	0.1461	0.1464	0.1461	0.1536	0.1461	0.1610	0.1461	0.1688	0.1461	0.1770
Average	**0.1368**	**0.1345**	**0.1368**	**0.1390**	**0.1368**	**0.1436**	**0.1368**	**0.1484**	**0.1368**	**0.1535**
CCA Rate Premium/(Savings)		**1.72%**		**-1.55%**		**-4.73%**		**-7.83%**		**-10.85%**

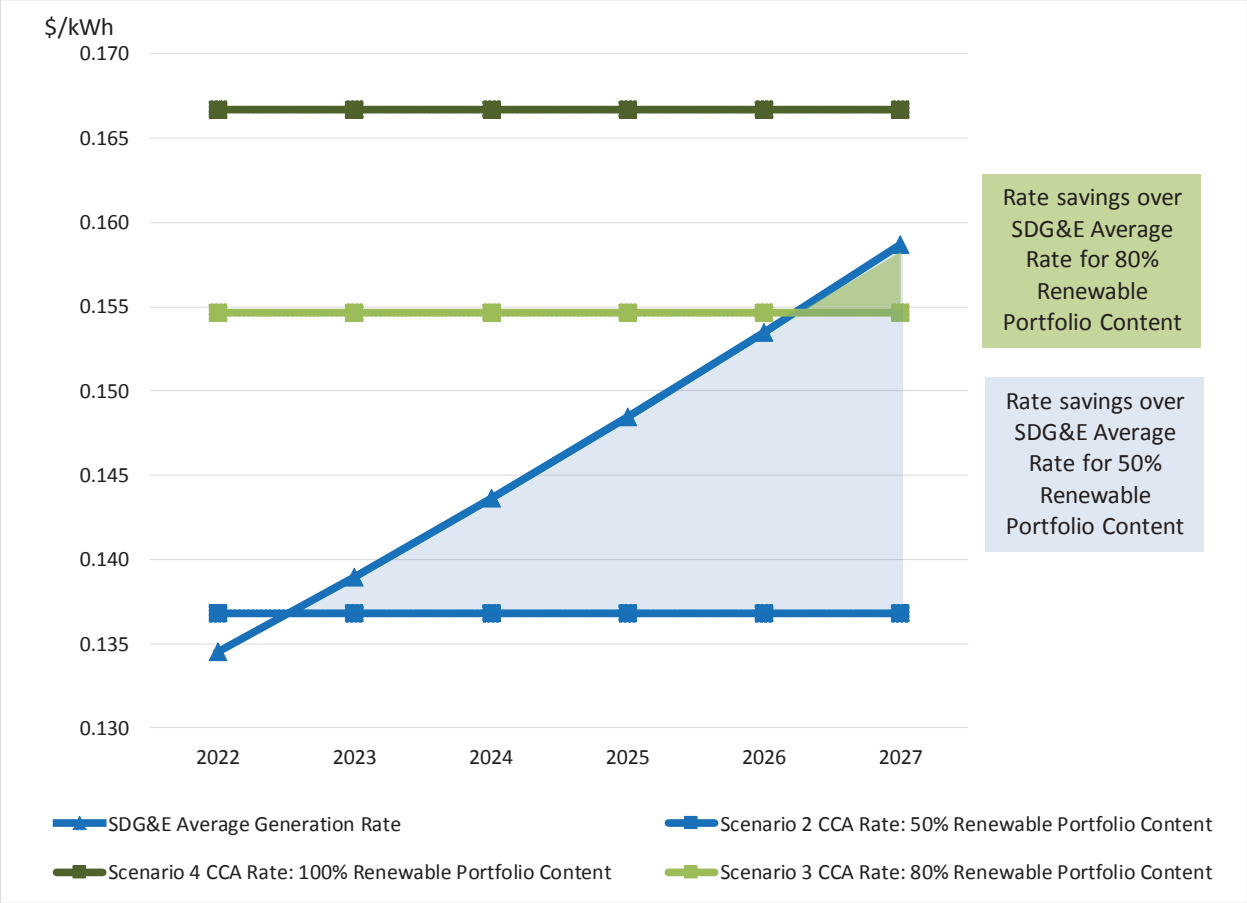
[*] Refer to Special Condition 3, Sheet 5: http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_DR.pdf for a definition of SDG&E Baseline load levels and associated rates.

Table ES-5: Base Case Scenario Rate Comparison by Customer Class CCA v. SDG&E EcoChoice ($/kWh)

Indicative Comparison 100% Renewable Portfolio Content (Average Monthly Load Above 130% SDG&E Baseline [*])										
	2022		2023		2024		2025		2026	
Rate Class	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates	CCA Rates	SDG&E Rates
Agriculture	0.1504	0.1315	0.1504	0.1327	0.1504	0.1339	0.1504	0.1351	0.1504	0.1363
Commercial/Industrial Small <20kW	0.1620	0.1383	0.1620	0.1415	0.1620	0.1448	0.1620	0.1481	0.1620	0.1515
Commercial/Industrial Large >20kW	0.1639	0.1190	0.1639	0.1225	0.1639	0.1262	0.1639	0.1300	0.1639	0.1338
Residential	0.1816	0.1326	0.1816	0.1391	0.1816	0.1458	0.1816	0.1529	0.1816	0.1603
Residential California Alternate Rates for Energy (CARE)	0.1761	0.1271	0.1761	0.1333	0.1761	0.1398	0.1761	0.1466	0.1761	0.1537
Average	**0.1668**	**0.1297**	**0.1668**	**0.1338**	**0.1668**	**0.1381**	**0.1668**	**0.1425**	**0.1668**	**0.1471**
CCA Rate Premium/(Savings)		**28.60%**		**24.65%**		**20.80%**		**17.04%**		**13.38%**
[*] Refer to Special Condition 3, Sheet 5: http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_DR.pdf for a definition of SDG&E Baseline load levels and associated rates.										

The following discussion explains how the CCA program could progressively and competitively increase the RPC of its supply portfolio over time. For this simple illustration, only average energy commodity rates are examined, no EcoChoice rates were considered. Using the overall average energy commodity rates for the CCA program and SDG&E presented in Table ES-4 and Table ES-5 above, Figure ES-8 illustrates how the CCA program could competitively increase its RPC over time. As can be seen in this figure, in 2023 CCA rates for the 50% RPC supply portfolio become lower than the forecasted SDG&E average rate, and baseload CCA customers experience rate savings. The amount of rate savings is indicated by the shaded area under the SDG&E Average Rate line and above the CCA program Scenario 2 Rate line. Around 2026, the SDG&E Average Rate line approaches the CCA program Scenario 3 rate line, at which point the CCA program's 80% RPC portfolio becomes competitive. Again, the potential amount of rate savings over SDG&E Average rates for this higher RPC supply is indicated by the shaded area between the two rate lines. The CCA's 100% RPC portfolio remains higher than SDG&E's Average Rate through at least 2027.

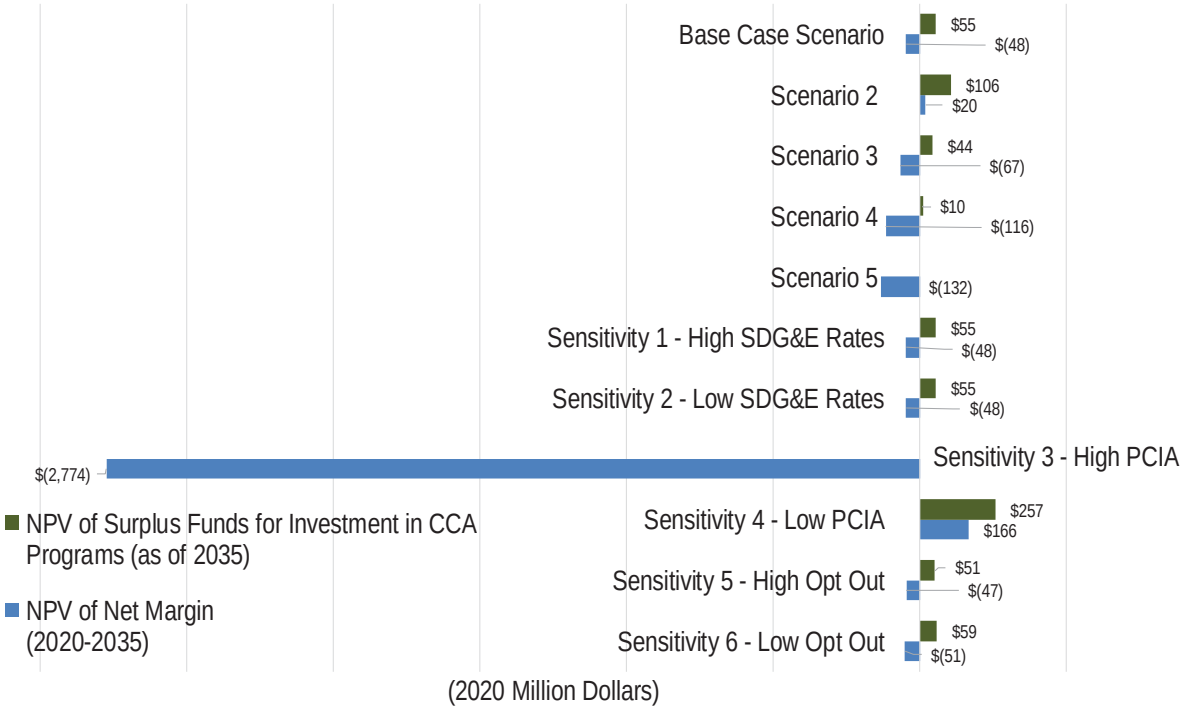
Figure ES-8: Illustrative CCA Renewable Portfolio Content Progression Based on Rate Comparisons



The CCA rates, shown in Figure ES-8 for years 2022-2027, are held constant throughout the remainder of the Study period. These unchanging rates are explained by the fact that the largest component of operating expenses, power procurement, is not expected to increase over the Study period. In fact, for all scenarios examined, by year 2035 power procurement costs decrease over time. CCA rates were set initially based on COS study results for the average of three full years of "normal" operation. Over time, the surplus generated by decreasing operational costs, driven by lower forecasted power costs, could be used to either decrease rates or keep rates constant. With rates held constant, the surplus funds could be used to procure higher levels of RPC power supply and/or invest in local renewables and energy programs. For purposes of the Study, the surplus CCA program funds were assumed to be invested in various demand-side management (DSM) initiatives, such as conservation and energy efficiency (EE), and local development of renewable generation resources.

Concluding the discussion of Study Results, Figure ES-9 provides a summary overview of operating results by scenario and sensitivity analysis. This Figure depicts the net present value (NPV), using a 4% discount rate, of the annual net margins over the Study period as well as the NPV of surplus funds that are forecasted to be available for investment as of year 2035, for all the scenarios and sensitivity analyses.

Figure ES-9: CCA Operating Results by Scenario & Sensitivity Analysis



Base Case Scenario: 50% Renewable Portfolio Content for 98% of customers and 100% RPC for 2%
Scenario 2: 50% Renewable Portfolio Content for all customers
Scenario 3: 80% Renewable Portfolio Content for all customers
Scenario 4: 100% Renewable Portfolio Content for all customers
Scenario 5: 80% Renewable Portfolio Content for 98% of customers and 100% RPC for 2%
PCIA: Power Charge Indifference Adjustment

The net margins represent net operating income less debt service. The low, and sometimes negative, NPVs of net margins are owed to the large up front investments required to establish the CCA program and the lag in customer participation and associated revenues. However, annual net margins in all cases, except Sensitivity Analysis 3 - High PCIA, are shown to steadily increase year over year, becoming positive around year 2026 and remaining positive, on average, throughout the remainder of the Study period.

For most of the scenarios and sensitivity analyses examined, the first years of net margins are sufficiently negative to cause the NPV of the net margins over the entire Study period to also be negative. If looking at the CCA program from a traditional investment perspective, the negative NPV of net margins would indicate the CCA program under the Base Case does not make financial sense. However, the Study

includes consideration of entirely different factors when assessing CCA program feasibility, including the achievement of stated program goals and overall financial feasibility and solvency.

The working capital—a measure of the CCA program's ability to meet its obligations with current assets—can be deemed adequate from onset of the CCA program throughout the Study period, again for all cases except Sensitivity Analysis 3 – High PCIA. Working capital available may deviate from the working capital target for any given year, but given the conservative target for working capital set within the Study and the available amount of cash on hand, the CCA program is reliably solvent and financially feasible.

After around year 2026, the CCA program consistently accumulates surplus working capital—funds assumed to be available for investment—again for all cases except Sensitivity Analysis 3- High PCIA. The funds available for investment represent surplus funds that could be used for achievement of the City CCA program goals and initiatives, such as, investment in local renewable distributed generation (DG); local utility-scale or community renewable energy projects; DSM, EE, and conservation programs; low income programs; or other actions to support the CAP.

BENEFITS

In addition to the goals for establishing a CCA program discussed above, the following potential benefits are addressed: GHG reductions, economic development, and other CCA program opportunities.

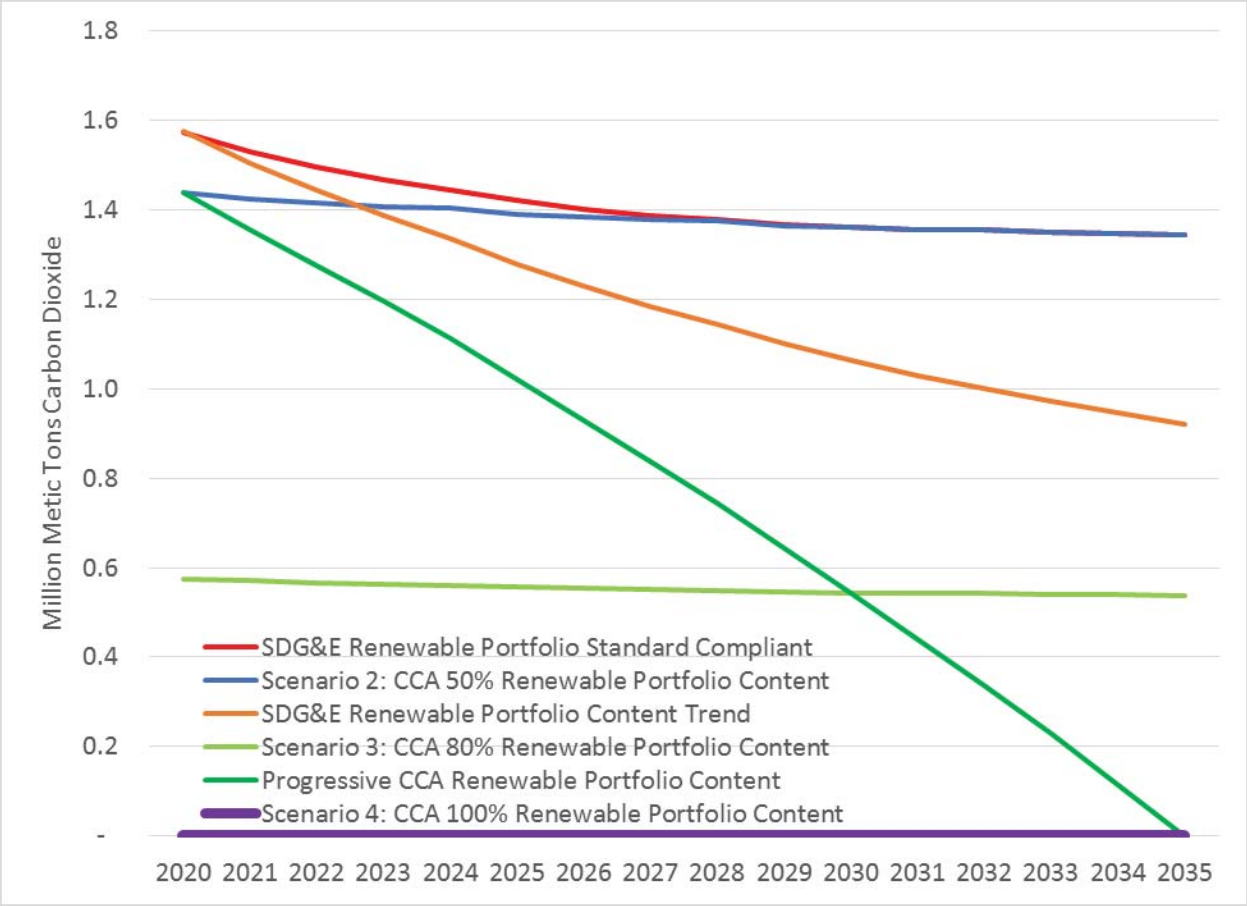
GHG REDUCTIONS

A primary impetus behind exploring a CCA program is the City's goal of reaching 100% renewable energy supply by 2035. This section addresses the potential incremental GHG reductions that the CCA program may achieve over SDG&E based on assumed RPC in the power supply. Although some RPS[xi] resources have GHG emissions, for purposes of this Study renewable generation is assumed to have zero carbon dioxide (CO_2) emissions. This assumption is an important caveat given the need for deployable generation resources (i.e., non-renewable energy resources) to meet electricity demand in real time given such resources produce GHGs. The estimates provided here are intended to provide decision makers with relative outcomes rather than a precise GHG inventory.

[xi] California Public Utilities Commission Renewable Portfolio Standard Homepage accessed March, 2017: http://www.cpuc.ca.gov/RPS_Homepage/.

Figure ES-10 depicts the projected emissions reductions based on the different SDG&E RPC forecasts and CCA RPC scenarios. These projections are solely for the illustrative purposes of estimating potential GHG reduction.

Figure ES-10 Projected Carbon Dioxide Emissions by CCA Scenario and SDG&E Forecast



ECONOMIC BENEFITS

Establishing a CCA program is expected to result in three levels of economic impact. The first or primary level includes two economic impacts: lower energy bills for customers and development of local renewable resources to support increased levels of CCA supply portfolios.[xii] The second level of economic impacts includes those resulting from customer-incentive programs created by the CCA program. The third level of economic impacts includes environmental and health impacts related to air quality or improved human health due to the increased use of renewable energy sources.

In sum, under Base Case Scenario assumptions, implementation of the CCA program is expected to generate job creation and local investment benefits while also achieving targeted sustainability goals. Although, within the context of the economies of the City and region, the job creation associated with

[xii] These results are predicated on lower energy rates for CCA customers compared against the forecasted SDG&E rates. This may or may not occur as actual CCA and SDG&E rates are subject to change.

renewable energy project construction and operations is expected to be modest. The economic impact analysis illustrates the potential for the CCA program to leverage the economic development impact of related EE and renewable energy activities at the local level. Study results are based on installation of ten crystalline silicon, fixed mount solar systems with nameplate capacities of 1 Megawatt (MW) each for a total capacity of 10 MW. The 10 MW of solar photovoltaic (PV) capacity is for illustrative purposes to analyze economic impact. This illustration is not used for the pro forma modeling of the CCA. Wind and other renewable generation were excluded from consideration due to locational constraints.

Based on this evaluation, as summarized in Table ES-6, a total of 544.7 jobs, $18.9 M in labor income and $48.8 M in annual ongoing economic output from utility savings were identified. One-time construction from EE and renewable energy resources could generate approximately 58.4 jobs, $3.6 M in labor income and $7.0 M in regional output, followed by 10.8 jobs, $2.9 M in labor income and $3.9 M in annual economic output from operating expenditures.

Table ES-6: Summary of Potential CCA Program Economic Impacts – Base Case Scenario

Impact Type[i]	Jobs	Labor Income ($)	Total Output ($)
Increased Disposable Income - Ongoing Operations			
Direct Effect	435.2	$12,838,821	$31,116,656
Indirect Effect	42.8	$2,687,672	$7,772,725
Induced Effect	66.6	$3,379,934	$9,932,081
Total Effect	544.7	$18,906,427	$48,821,462
Local Investment - During Construction and Installation Period			
Project Development and Onsite Labor Impacts	24.2	$1,594,800	$2,108,500
Module and Supply Chain Impacts	22.0	$1,339,000	$3,111,100
Induced Impacts	12.2	$616,100	$1,788,000
Total Impacts	58.4	$3,549,500	$7,007,600
Local Investment - Ongoing Operations			
Onsite Labor Impacts	0.5	$2,286,100	$2,286,100
Local Revenue and Supply Chain Impacts	5.0	$290,600	$849,000
Induced Impacts	5.4	$271,100	$786,800
Total Impacts	10.8	$2,847,800	$3,921,900

[i] Earnings and Output values are in year 2015 dollars. Construction and operating period jobs are full-time equivalent for one year (2,080 hours). Economic impacts "During operating years" represent impacts that occur from system/plant operations/expenditures.

Source: National Renewable Energy Laboratory Jobs and Economic Development Impact Model; IMPLAN Group LLC Multipliers; EnerNex; and Willdan, 2017.

CONCLUSIONS & RECOMMENDATIONS

This section of the Executive Summary presents the primary Study conclusions and provides recommendations based on Study results, including potential next steps associated with the CCA program development.

PRIMARY STUDY CONCLUSIONS

Following are the primary Study conclusions, which are based on the considerations, assumptions, and analyses conducted as described within this report:

- It is feasible that the CCA program would be able to meet the majority of the SEAB's recommended minimum performance criteria, including GHG reductions to meet CAP targets and having an energy supply that is 100% from renewables (excluding use of Renewable Energy Credits).
- It is feasible that the CCA program would have electric rates that are competitive with the incumbent utility. Under the various scenarios examined, by and large the CCA program rates for most of the Study period remain below those projected for SDG&E, indicating that from ratepayer's perspective, the CCA program would be beneficial. The rate competitiveness would be driven by several key assumptions, including:
    - The persistence throughout the Study period of relatively high SDG&E generation rates which are above other IOUs in California and are some of the highest rates in the nation;
    - The forecast of the City CCA program's all-in energy supply procurement costs (including renewable and natural gas-fired generation, CAISO energy and capacity costs, and other market charges) remaining less than the forecasted SDG&E generation rates; and
    - The forecast of the CCA program's set-up and operational costs, not directly related to power procurement costs, remaining relatively flat and a small portion of total costs over the Study period.
- It is feasible that the CCA program would be reliably solvent and financially feasible. Although initially net margins are negative in the majority of scenarios examined, net margins are shown to steadily increase year over year, become positive after the first five to seven-year period and remain positive and growing throughout the remainder of the Study period. Working capital would also be deemed adequate from onset of the CCA program throughout the Study period.
- Although not during the initial five to seven-year period, it is feasible that the CCA program could eventually generate enough net margins to make substantial investments in high priority energy initiatives, such as increasing local DG as well as EE, demand response (DR), and other DSM related initiatives. Such reinvestments could offset some portion of projected economic impacts based on disposable income.
- It is feasible that the CCA program could have a positive economic impact in terms of increased disposable income and local jobs creation.

- Risks are associated with many aspects of the CCA program and can be material, as in the case of power procurement activities. The CCA program must evaluate, quantify, and prioritize such risks and develop appropriate mitigation strategies to achieve success.

- The sheer size of the City CCA would be materially larger than all CCA programs in existence. In fact, based on annual load, the City CCA would be over twice the size of all the other operating CCAs, except for Peninsula Clean Energy, and nearly ten times bigger than half of the operating CCAs. The magnitude of this proposed venture could significantly impact operations and risk exposure in ways not yet experienced by other CCA programs. Further, the impact on SDG&E of departing load represented by the City CCA program would be difficult to predict given lack of comparable examples. Similar risks are faced by Los Angeles Community Choice Energy and San Jose Clean Energy CCA programs.

RECOMMENDATIONS

Following are the primary Study recommendations, which are based on the considerations, assumptions, and analyses conducted as described within this report:

1. The effect of the CCA program customers, which represent a substantial portion of SDG&E's customer base, no longer purchasing the energy commodity from SDG&E may have a significant impact on the PCIA and SDG&E power procurement strategies going forward. Given the nature of the PCIA and attendant risk to the CCA program, the City should:

    - Prioritize this issue;
    - Create a strategic plan for addressing this risk;
    - Mobilize internal resources to monitor and to support this strategic plan; and
    - Engage with the California Public Utilities Commission (CPUC), SDG&E, and other stakeholders to inform the strategic plan and move the plan forward.

2. State CCA programs have formed an association called California Community Choice Association (CalCCA) to represent CCA programs in the legislature and at the relevant regulatory agencies including the CPUC, California Energy Commission (CEC), and California Air Resources Board. It is recommended the City join CalCCA[xiii] to engage with other CCA programs and learn from their experiences, understand the changing CCA landscape, and for both advocacy and insight into what other CCA programs are doing. Member Dues would be $75,000 per year assuming projected CCA retail energy sales in excess of $500 million.

3. Should the City continue to pursue forming a CCA program, it should engage appropriate industry professionals to vet pro forma assumptions and results. Such professionals would likely include a registered Financial Advisor, a power supply risk management expert, renewable energy generators and developers, and other industry professionals.

[xiii] California Community Choice Association: http://cal-cca.org/

4. The primary economic development policies and priorities that the City should explore to fully leverage the potential local job creation and business investment of the CCA program include:

   - Target partnerships with local cleantech companies in the early years through existing economic development marketing and branding activities and the proposed "Buy San Diego" campaign.[xiv]

   - Target locally sourced materials, supplies, services when possible—adhere to Department of Defense "Buy American" guidelines for materials and supplies where and when possible.

   - Shift acquisition of materials, supplies and services from external to local sources as the program is implemented over time.

   - Explore establishing procurement targets for construction/operations with preference for retrained veterans, agricultural workers, returning offenders (Work Opportunity Tax Credits available for retraining costs).

   - A major motive for the development of a CCA program is to bolster local economic development. CCAs can offer a special economic development rate to encourage manufacturers to site in San Diego thus supporting the City's strategy to stimulate manufacturing jobs.

   - Lower utility costs would enhance the City's economic competitiveness, particularly for large power users such as the military, aerospace/defense, biotech/medical device electronics/ telecommunications, and international trade/logistics manufacturers.

[xiv] City of San Diego Economic Development Strategy (2014-2016), 2.3 Manufacturing & Innovation, Action 7, page 10.