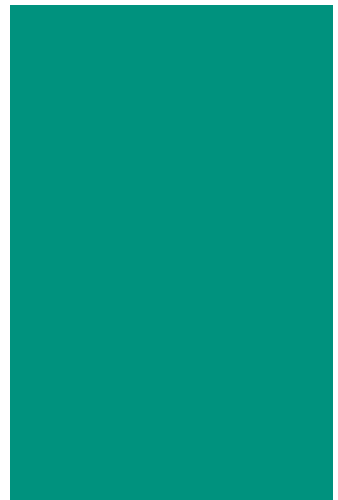


MCE 2020 Integrated Resource Plan



APPROVED BY MCE'S TECHNICAL COMMITTEE ON OCTOBER 3, 2019

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I. Introduction

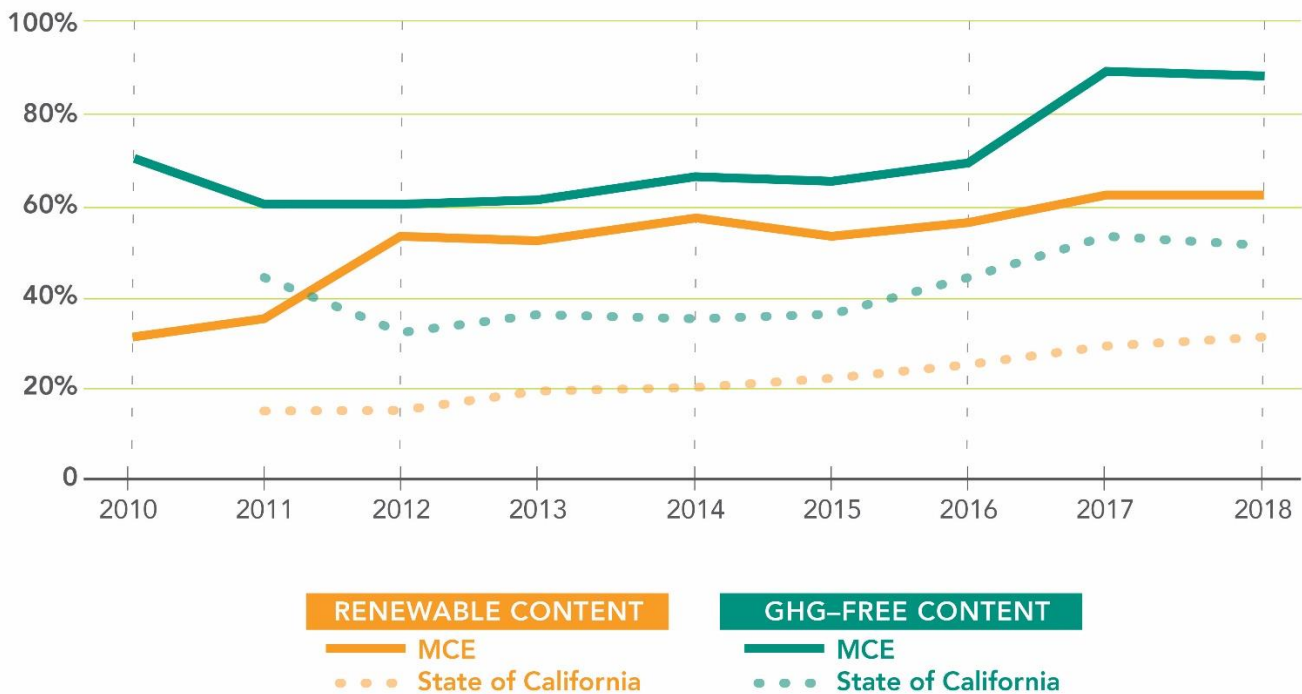
Executive Summary

MCE plans for and secures commitments from a diverse portfolio of generating resources to reliably serve the electricity supply requirements of its customers over near-term, mid-term and long-term planning horizons. This Integrated Resource Plan (“IRP”), which is voluntary, publicly available and updated on an annual basis, documents MCE’s resource planning policies and objectives over the upcoming ten-year planning period from 2020 through 2029 (the “Planning Period”).¹

Highlights of this IRP update include the following:

- MCE has outpaced the State of California in both its renewable and Greenhouse Gas-free (“GHG-Free”) portfolio content, while providing MCE’s customers with an estimated \$50.2 million in rate saving versus the incumbent utility through 2018 (see Figures 1 and 2 directly below).

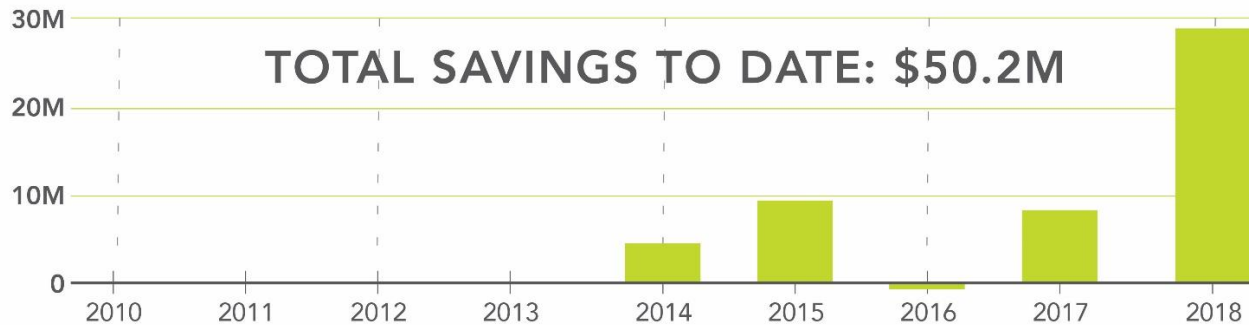
Figure 1: MCE Trendline for Renewable and GHG-Free Content²



¹ As mandated by California’s Senate Bill 350, passed in 2015, MCE is also required to submit a biennial IRP to the California Public Utilities Commission (“CPUC”) in even years. This “SB 350 IRP” is based on different templates and assumptions, but MCE is working closely with CPUC staff to better align the two IRP processes. The next SB 350 IRP is due to the CPUC in May 2020.

² As reported to the California Energy Commission’s Power Source Disclosure Program.

Figure 2: MCE Customer Cost Savings



- During the next five years (2020 through 2024), 60% or more of MCE’s Light Green service option will continue to be comprised of renewable energy; MCE has maintained this 60% level since 2017. By 2022, MCE also plans to eliminate its use of Portfolio Content Category 2 (“PCC 2”) renewable energy, meaning that the entire 60% of the Light Green portfolio will be supplied with Portfolio Content Category 1 (“PCC 1”) renewable energy. In addition, by 2022 MCE plans to eliminate its reliance on CAISO system power, meaning that the remaining 40% of the Light Green portfolio will be completely supplied by large hydroelectric resources³ and asset-controlling supplier (“ACS”) energy, the vast majority of which is large hydroelectric energy. With this 2022 target portfolio, MCE is planning to provide its Light Green customers with electricity that is approximately 99% GHG-Free.⁴
- During the latter five years of the Planning Period (2025 through 2029), MCE’s Light Green portfolio will see a steady ramp up in PCC 1 renewable energy and a corresponding ramp down in large hydroelectric and ACS energy. By 2029, the target for MCE’s Light Green portfolio will be 85% PCC 1 renewable energy and 15% large hydroelectric and ACS energy.
- MCE continues to provide customers with two 100% renewable energy service options: (1) Deep Green, which is wholly sourced from solar and wind projects located in California; (2) Local Sol, which began supplying participating customers in July 2017 with 100% solar photovoltaic (“PV”) energy from facilities that are located entirely within MCE’s service area. Both Deep Green and Local Sol options are 100% GHG-Free.
 - MCE is projecting a significant increase in Deep Green retail sales, from 168,000 MWh (2018 results) to 370,000 MWh in 2029, driven by an MCE campaign to proactively reach out to customers and facilitate opt-ups to Deep Green service. As of June 30, 2019, MCE has more than 10,000 Deep Green customer accounts.
 - In 2018, Local Sol retail sales totaled 919 MWh. As of June 30, 2019, MCE has 182 customer accounts on Local Sol.
- MCE continues to directly support the development of local renewable energy projects as follows: (1) through its Net Energy Metering (“NEM”) program; (2) through its Feed-In Tariff (“FIT”) programs; (3) through other PPAs for local renewables that don’t qualify for MCE’s FIT programs. Notable achievements in this area include the following:

³ Large hydroelectric resources are greater than 30 MW. While such resources provide GHG-Free power, they do not qualify as renewable power that can be used to meet California’s Renewables Portfolio Standard (“RPS”) requirements, per the California Energy Commission’s RPS Eligibility Guidebook.

⁴ Beginning with MCE’s 2019 results, MCE’s Light Green GHG-Free percentage will be derived as follows: [MCE Light Green MT CO₂e, per CEC Power Content Label] / [(MWh of MCE Light Green Retail Sales) x (0.428 MT CO₂e/MWh)]. For reference, 0.428 MT CO₂e/MWh is the emissions factor for unspecified electricity, per the California Air Resources Board.

- As of June 30, 2019, MCE serves 33,485 NEM customers, representing 7.1% of total accounts served. These NEM customers have installed 337 MW of behind-the-meter photovoltaic solar capacity.⁵
 - Since 2012, MCE has allocated \$535,000 for solar rebates and has provided \$193,900 in rebates to contribute to the installation of 239 solar systems, 220 of which occurred on the homes of low-income customers, in partnership with GRID Alternatives. These rebates supported 643 kW of new solar generation, 519 kW of which was provided to low income customers. GRID Alternatives estimates that the program participants will save more than \$3.5 million on their monthly utility bills over 20 years and eliminate more than 6,400 metric tons of GHG emissions over the 25-year lifespan of the installations. Starting in 2018, NEM customers can now choose to transfer their excess solar credits to this rebate program, providing more rebates and access to solar for communities that otherwise would not have the option.
 - MCE continues to administer one of California’s most generous FIT programs for locally situated, smaller-scale renewable generating resources that supply wholesale electricity to MCE. This program utilizes standard offer (i.e. non-negotiable) contracts that are available on a first-come, first-served basis for up to 45 MW of qualifying renewable energy projects within MCE’s service area. Specific terms and conditions for the FIT program are available on MCE’s website.
 - In addition to procuring through its FIT programs, MCE continues to procure energy from other renewable generating facilities that are constructed in MCE’s service area. For example, MCE procures approximately 30,000 MWh of renewable energy and associated capacity annually from the 4 MW Redwood Landfill power generation facility, which is located in Novato, CA and achieved commercial operation in September 2017. Another example is the 10.5 MW MCE Solar One, a PV project that MCE helped develop on a brownfield site next to Chevron’s oil refinery in the City of Richmond, CA. The installation, which achieved commercial operation in December 2017, generates approximately 22,000 MWh per year. Both the Redwood Landfill and MCE Solar One facilities are under contract with MCE for a 20-year term.
- MCE’s existing and planned supply commitments throughout the Planning Period will enable MCE to meet all required regulatory mandates and voluntary procurement targets related to renewable, large hydroelectric and ACS energy. MCE has taken important steps to ensure delivery of a reliable, environmentally responsible power supply portfolio, including:
- Contracting for state-mandated Renewable Portfolio Standard (“RPS”) compliance requirements as well as for MCE’s voluntary renewable energy targets. MCE is 13 years ahead of schedule in procuring for state-mandated renewables, as MCE in 2017 began meeting the SB 100 RPS requirement of 60% by 2030.
 - Increasing energy purchases from new, renewable energy resources that are California-based (and often based within MCE’s service area).
 - Procuring Resource Adequacy (i.e., capacity) in accordance with California regulations.
 - Contracting for supply that provides a hedge against MCE’s California Independent System Operator (“CAISO”) load payments - thereby reducing exposure to wholesale market price volatility.

⁵ Based on 337 MW of capacity, using a capacity factor of 16%, MCE expects 472 GWh of behind-the-meter generation in 2019.

- MCE is working toward a long-term goal of offsetting 2% of its annual energy and capacity requirements with energy efficiency (“EE”) and distributed energy resource (“DER”) programs. MCE is also exploring a number of innovative DER strategies aimed at reducing customer costs and associated GHG emissions. Specific to capacity requirements, MCE’s goal is to provide 5% of its annual Resource Adequacy capacity via demand response (“DR”) programs by the end of the Planning Period.

Every year, MCE staff updates the IRP and submits it for approval to MCE’s Board or Technical Committee, which includes a subset of MCE Board members. Such approval is made in consideration of applicable regulatory requirements, MCE’s resource planning policies, energy market conditions, anticipated changes in electricity consumption, planned inclusion of new member communities, ongoing procurement activities, and any other considerations that may affect the manner in which MCE carries out its resource planning activities.

MCE’s IRP has four primary purposes:

1. Quantify resource⁶ needs, in conjunction with load expectations, over the Planning Period;
2. Prioritize resource preferences and articulate relevant energy procurement policies;
3. Provide guidance to the energy procurement processes undertaken by MCE staff; and
4. Communicate MCE’s resource planning objectives and framework to the public and key stakeholders.

MCE Overview

MCE is California’s first Community Choice Aggregation Program, a not-for-profit, public agency that began service in 2010 with the goals of providing cleaner power at stable rates to its customers, reducing greenhouse emissions, and investing in targeted energy programs that support communities’ energy needs. As a load-serving entity, MCE has approximately 473,000 customer accounts, serving more than one million residents and businesses in 34 member communities across four Bay Area counties: Napa, Marin, Contra Costa, and Solano. MCE delivers more than 5,000 GWhs annually to its customers and has a peak demand of approximately 1,000 MW.⁷

⁶ Within this IRP, resources include renewable energy, hydroelectric energy, Asset Controlling Supplier energy, energy storage, Resource Adequacy, hedges against CAISO load payments, behind-the-meter generation, demand response and energy efficiency.

⁷ As of 6/30/2019.

Figure 3: MCE Service Area, including new communities receiving MCE service in 2020



MCE provides service to more than 86% of electricity customers within its service area and is the default electric generation provider for any new or relocated customers therein.

As a mission-driven organization, MCE works toward the following:

- Reducing GHG emissions and accelerating the supply of clean energy being delivered to the grid.
- Developing community programs and local energy projects to expand access to competitively priced renewable energy and energy efficiency programs for all customers.

II. MCE Customers and Load Forecast

MCE's long-term load forecast is driven primarily by two variables: (1) the number of customers that MCE expects to serve; and (2) weather. The long-term load forecast for resource planning incorporates the seasonal electricity consumption patterns of MCE's projected customer base, including adjustments for load modifying effects of distributed energy resources, energy efficiency and electric vehicles.

Enrolled Customers

The scope of this IRP is limited to MCE's Board-approved service area. In accordance with Policy No. 007 - New Customer Communities, MCE may include additional communities that request service during the Planning Period. Any specific resource planning impacts related to future inclusion of additional member communities would be addressed by MCE's Board prior to the completion of such processes and incorporated into future IRPs.

Customer participation rates are expressed as the proportion of customers that are currently served by MCE relative to the number of customers that are eligible to receive service.⁸ The difference between current customers and eligible customers represents the subset of customers that have chosen to opt-out of the MCE program. These customers receive bundled service from Pacific Gas & Electric ("PG&E"), the incumbent Investor Owned Utility in MCE's service area. The vast majority of customer opt-outs occur within a 120-day period beginning 60 days prior to each customer's scheduled MCE service commencement and continuing for 60 days thereafter – this period of time is generally referred to as the "enrollment period."

During the enrollment period, prospective and enrolled customers receive a minimum of four mailed notices, which explain MCE's service options and the opt-out process among other terms and conditions of service. Some of these notices target unique messages for special customer classes. For example, low-income customers on the energy discount programs such as California Alternate Rates for Energy ("CARE") or Family Electric Rate Assistance ("FERA") or Medical Baseline will be informed that their discounts remain with MCE service and that they do not need to reapply. These notices are complemented by a variety of targeted marketing and community outreach efforts to raise awareness of the upcoming change to electric service. Much of this strategy is captured in the Community Outreach Plan written by MCE staff with input from local leaders, community staff, and elected officials. The community outreach strategy includes tabling events, presentations to local groups, contacting high electricity users, local print and digital advertising, and creating a Community Leader Advisory Group to help guide MCE's outreach strategy to maximize awareness and education about Community Choice. MCE's outreach strategies particularly emphasize reaching special populations, such as low-income and fixed-income populations, as well as those who speak English as a second language.

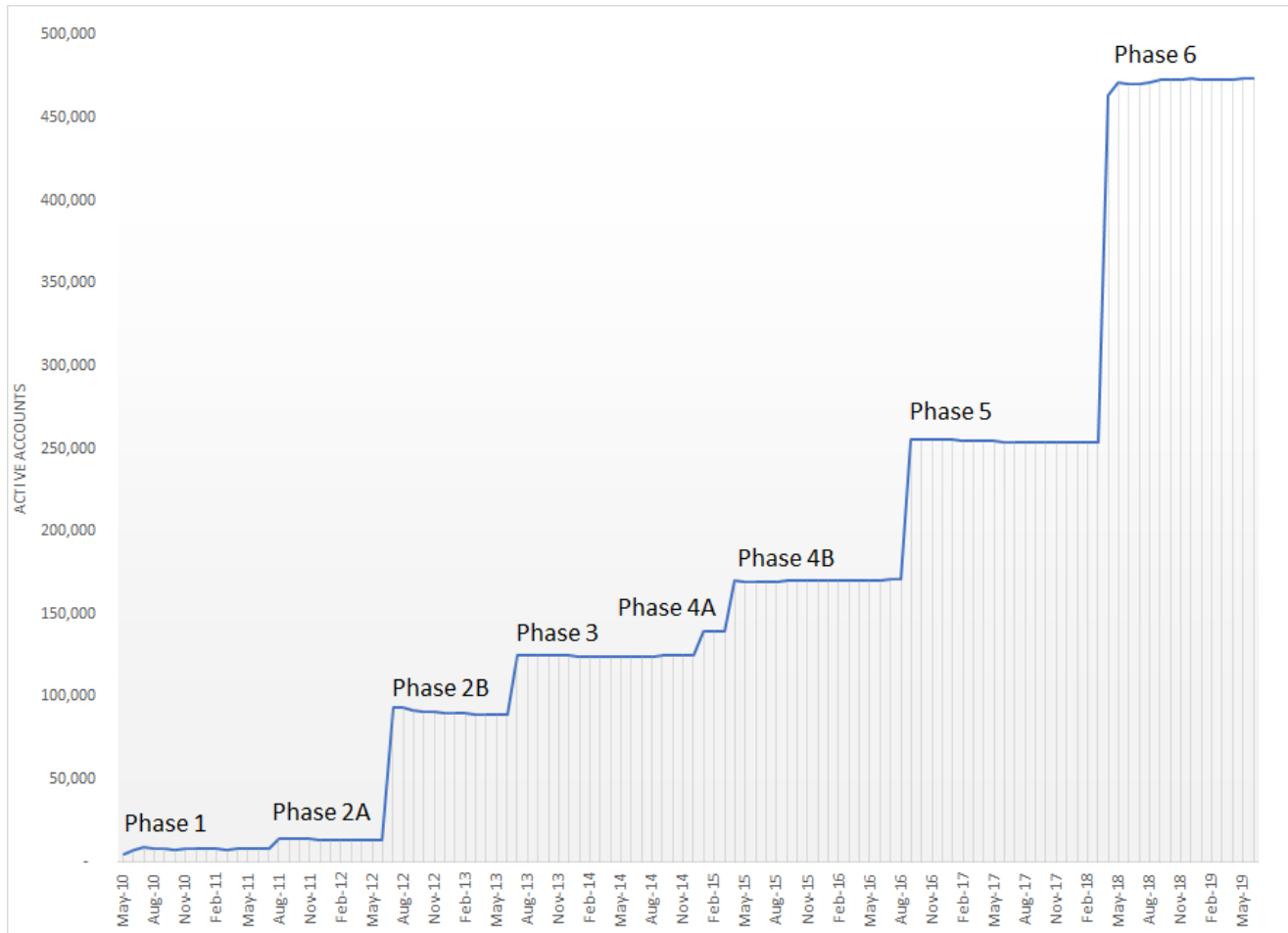
The customer participation rate associated with MCE's initial enrollments of Marin County is 78%. Customer participation rates have increased in subsequent MCE enrollment phases: 81% of customers who were offered service following inclusion of the City of Richmond have continued with MCE; 86% in MCE's subsequent expansion footprint of Benicia, San Pablo, El Cerrito, and unincorporated Napa County; 89% involved in the September 2016 inclusion of American Canyon, Calistoga, Lafayette, Napa, St. Helena, Walnut Creek, and Yountville; and 90% involved in the April 2018 inclusion of Concord, Danville, Martinez, Moraga, Oakley, Pinole, Pittsburg, San Ramon, and unincorporated Contra Costa County. This trend reflects the impact of MCE's outreach efforts, increased awareness of the MCE brand and service advantages, legislation limiting certain Investor Owned Utility ("IOU") marketing tactics against CCAs, and a growing familiarity with the CCA service model. The various phases of MCE's growth are summarized and illustrated in Table 1 and Figure 4, respectively.

⁸ This does not include Direct Access customers operating within the new communities being enrolled.

Table 1: MCE Expansion Phases

MCE Phase	Description	Number of Accounts (as of the Enrollment Date)	Implementation Date
Phase 1	MCE Member (municipal) accounts & a subset of residential, commercial and/or industrial accounts, comprising approximately 20% of total customer load within MCE's original Member Agencies.	8,500	May 7, 2010
Phase 2A	Additional commercial and residential accounts, comprising approximately 20% of total customer load within MCE's original Member Agencies (incremental addition to Phase 1).	6,100	August 2011
Phase 2B	Remaining accounts within Marin County.	79,000	July 2012
Phase 3	Residential, commercial, agricultural, and street lighting accounts within the City of Richmond.	35,000	July 2013
Phase 4A	Residential, commercial, agricultural, and street lighting accounts within the unincorporated areas of Napa County.	14,000	February 2015
Phase 4B	Residential, commercial, agricultural, and street lighting accounts within the City of San Pablo, the City of Benicia and the City of El Cerrito.	30,000	May 2015
Phase 5	Residential, commercial, agricultural, and street lighting accounts within the Cities of American Canyon, Calistoga, Lafayette, Napa, Saint Helena, Walnut Creek and the Town of Yountville.	83,000	September 2016
Phase 6	Residential, commercial, agricultural, and street lighting accounts within the Cities of Concord, Danville, Martinez, Moraga, Oakley, Pinole, Pittsburg, San Ramon, and unincorporated Contra Costa County.	216,300	April 2018

Figure 4: Active MCE Customers Per Phase Rollout



Baseline Customer and Consumption Forecast

MCE's electricity demand forecast starts with a forecast of customers by end-use classification (residential, commercial, etc.). Monthly energy consumption estimates, derived from historical data, are applied to yield a monthly energy forecast by customer class. Hourly class-specific load profiles are then used to break down the monthly energy forecast into more granular time-of-use and peak demand values. MCE makes adjustments to the forecast to account for the load impacts of its DER programs, solar growth, energy efficiency and electric vehicle ("EV") charging.

Customer Energy Choices

Light Green Service

MCE offers its customers a Light Green service option, at least 60% of which is sourced with RPS-qualifying renewable energy (ramping up to 85% RPS-qualifying renewable energy by 2029). This renewable-heavy portfolio is currently rounded out with large hydroelectric energy, ACS energy and a declining contribution from CAISO system power. MCE's Light Green Service product is the default option and currently accounts for the vast majority of customer accounts and load.

Deep Green Service

MCE offers a voluntary 100% renewable energy option to all customers, known as Deep Green service. The Deep Green supply portfolio relies exclusively on bundled renewable energy resources produced by California-based generators. Customer participation in Deep Green service directly impacts the quantity of incremental renewable energy volumes that MCE must procure to ensure that its broader supply portfolio includes sufficient renewable energy volume to support Light Green and Deep Green participation. Additionally, half of the premium charged to Deep Green customers is allocated to the Local Renewable Energy Reserve Fund. This fund is allocated toward development of local projects and programs such as the MCE Solar One 10.5 MW solar PV project in Richmond, California, and MCE's electric vehicle charging infrastructure program. As a result, increased participation in Deep Green not only reduces a customer's electricity-related GHG emissions, but also supports local economic benefits, "green-collar" jobs within MCE's service area, and programs that provide benefits to MCE customers as a whole.

In 2018, MCE's Deep Green sales totaled 168 GWh (3.8% of MCE's total retail sales); in 2019, Deep Green sales are projected to increase slightly to 170 GWh, as private and public sector commercial customers are opting up to Deep Green service to achieve their sustainability goals and meet emissions reduction targets. As of June 30, 2019, 18 MCE member municipalities have enrolled their government accounts in Deep Green service, with 17 of these member municipalities enrolling all of their accounts.

Table 2: MCE Deep Green Participation, as of June 2019⁹

	Total MCE	Residential Deep Green	Non-Residential Deep Green	Total Deep Green
Number of Customer Accounts as of 6/30/19	473,520	7,389	2,654	10,043
		1.56%	0.56%	2.12%
2018 Retail Sales (MWh)	4,436,963	31,231	136,773	168,004
		0.70%	3.08%	3.79%

Local Sol Service

In 2014, MCE established its voluntary Local Sol service option. An alternative to MCE's Light Green or Deep Green service options, Local Sol's community-based service enables customers to sign up for 100% local solar generation from projects located within MCE's service area. Local Sol began serving customers in July 2017, following commercial operation of the supporting local generator at Novato's Cooley Quarry. Based on customer interest and subject to Board approval, MCE may consider expansion of the Local Sol program once the current program capacity is reached.

⁹ Percentages indicate portion of total MCE customers and retail sales, respectively.

Table 3: MCE Local Sol Participation¹⁰

Project Name	Program Capacity (Customer Accounts)	Program Capacity (MWh/year)	Number of Customer Accounts (as of 6/30/19)	2018 Retail Sales (MWh)
Cooley Quarry	~300	2,885	182	919

Power Content Label

MCE's Power Content Label ("PCL") is a key customer communication tool that provides information regarding MCE's proportionate use of various fuel sources during each year of operation. The 2018 PCL, which is MCE's most recent, quantifies MCE's aggregate renewable energy use: 61% renewable for Light Green customers; and 100% renewable for Deep Green customers. See Figure 5 directly below for more detail.

Figure 5: MCE 2018 Power Content Label

2018 POWER CONTENT LABEL				
MCE – mceCleanEnergy.org/energy-sources				
ENERGY RESOURCES	2018 MCE LIGHT GREEN POWER MIX	2018 MCE DEEP GREEN POWER MIX	2018 MCE LOCAL SOL POWER MIX	2018 CA POWER MIX** (for comparison)
Eligible Renewable	61%	100%	100%	31%
Biomass & biowaste	4%	0%	0%	2%
Geothermal	3%	0%	0%	5%
Eligible hydroelectric	2%	0%	0%	2%
Solar	11%	50%	100%	11%
Wind	39%	50%	0%	11%
Coal	0%	0%	0%	3%
Large Hydroelectric	13%	0%	0%	11%
Natural Gas	0%	0%	0%	35%
Nuclear	0%	0%	0%	9%
Other	13%	0%	0%	<1%
Unspecified sources of power*	13%	0%	0%	11%
TOTAL	100%	100%	100%	100%
* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.				
** Percentages are estimated annually by the California Energy Commission based on the electricity generated in California and net imports as reported to the Quarterly Fuel and Energy Report database and the Power Source Disclosure Program.				
For specific information about these electricity products, contact:			MCE 1 (888) 632-3674 info@mceCleanEnergy.org	
For general information about the Power Content Label, please visit:			www.energy.ca.gov/pcl	
For additional questions, please contact the California Energy Commission at:			Toll-free in California: 1 (844) 454-2906 Outside California: 1 (916) 653-0237	
These figures may not sum up to 100 percent due to rounding.				
Under energy resources, "Other" represents electric power registered by the California Air Resources Board and assigned an emission factor near zero metric tons of carbon dioxide equivalent per megawatt hour.				

¹⁰ Local Sol service capacity is based on usage of enrolled customers. As of 6/30/19, 182 customer accounts – of an estimated capacity of 300 – have enrolled.

Distributed Energy Resources (DERs)

MCE defines Distributed Energy Resources (“DERs”) to include behind-the-meter generation and storage, demand response, load shifting, electric vehicles and energy efficiency. MCE expects to utilize DERs to drive forward renewable energy, reduce GHG emissions, increase local workforce opportunities and help customers save money. While DER deployment is an emerging market opportunity, there are also numerous challenges to successful implementation. MCE is actively addressing these challenges by developing tools and pilot programs to usher in wider-scale DER deployment both within its service area as well as statewide.

MCE’s DER strategies include: development of local energy projects; exploration of market designs; creation of analytical tools to quickly analyze and evaluate the suitability of specific DER solutions; emphasis on DER pilots that reduce MCE’s exposure to wholesale market volatility; and shifting energy use away from peak evening hours when renewable energy production is low and market prices are high.

Current DER Programs and Projects

Building Efficiency Optimization

In 2017, the California Energy Commission (“CEC”) awarded MCE a Local Government Challenge Grant of \$1.75 million to pursue an innovative Building Energy Efficiency Optimization (“BEO”) pilot. The goal of this project is to facilitate scalability of DERs via a strong, data-driven siting and targeting approach, which will be applied to and validated by three demonstration projects.

The goals for this project are as follows: 1) to examine the role that CCAs, as local, independent government agencies, can play in navigating barriers that currently prevent broad and rapid deployment of targeted DERs; 2) to deliver an innovative and replicable CCA program solution that enables targeted DER portfolios to be coordinated, integrated, optimized, and dispatched rapidly across CCA service areas, thereby accelerating state and local climate action and progress toward GHG reduction goals. This solution will be available to use across MCE’s service area by Q4 2020.

Demand Response (DR)

MCE continues to analyze both the residential and commercial sectors for DR opportunities while also facilitating third-party DR programs in its service area. In addition, MCE customers are eligible for many of the DR programs administered by PG&E, and MCE receives DR allocations from PG&E administered programs equal to approximately 3% of MCE’s peak capacity requirement. Between MCE-implemented programs, those managed by third parties, and PG&E allocations, MCE intends for DR to account for 5% of its RA requirements by the end of the Planning Period.

MCE is currently developing limited-scope, pilot DR programs with a particular interest in exploring platforms and opportunities for aggregating and shifting load away from evening peak hours. In order to complement its PG&E DR allocations and MCE’s own programs, MCE is also working to gain a better understanding of third-party DR programs operating within its service area to learn where services are being provided and where gaps exist. Depending on the outcome of these activities, MCE may launch new DR programs and possibly seek funding from other sources for more robust programs in this sector.

Advanced Energy Rebuild Napa

In 2018 MCE partnered with the Bay Area Air Quality Management District, Napa County, BayREN, and PG&E, to administer up to \$1 million for electrification and solar rebates for single family homes affected

by the 2017 and 2018 wildfires in Napa County. Homeowners who are starting to rebuild from the devastation can access up to \$17,500 in incentives for these electrification measures (including high performance attics and walls, efficient windows, heat pump water and space heaters, smart thermostats, EV charging, and solar plus storage). This process braids multiple funding sources through one application process. There is an additional 20% incentive provided to income-qualified households.

Transportation Electrification

As part of its broader strategy to help electrify buildings and transportation within its service area (and accordingly reduce GHG emissions), MCE has been working on several electric vehicle (“EV”) related initiatives over the last 24 months. These initiatives include DR-enabled charging devices, incentives for electric buses, funding for charging stations, and a strategic plan & infrastructure analysis in partnership with the U.S. EPA to analyze local EV market trends and their impact on MCE’s customer demand.

MCE has identified workplace EV charging as an opportunity to shift demand of the 25,066 (and growing) EV drivers in its service area to hours of the day when energy is frequently cheaper, cleaner, and when excess renewable generation might otherwise be curtailed. [MCE Solar Charge](#) which opened in April of this year at MCE’s San Rafael office, demonstrates that vision to MCE’s staff and customers. MCE recently launched its Drive Deep Green initiative, which encourages drivers to switch to the Time-of-Use EV rate and opt up to MCE’s Deep Green 100% renewable generation service - since EVs are only as clean as the electricity that powers them. With competitive prices being offered for the EVs, themselves, MCE views them as a key value proposition for customers, given that the fuel (i.e., electricity) is largely generated from clean and abundant sources.

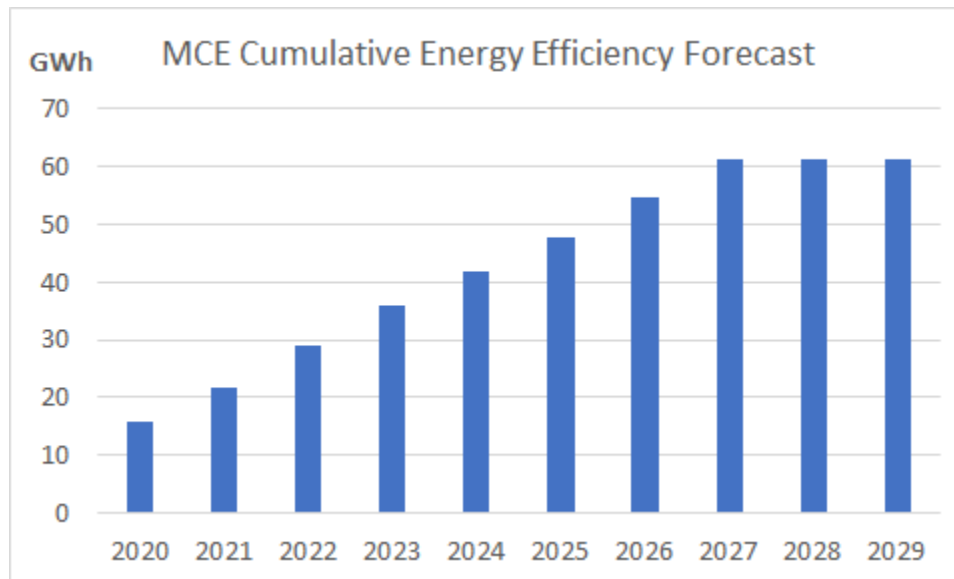
With respect to EV charging infrastructure, MCE has supported or funded 651 Level 2 charging ports for workplaces or multi-family properties since August 2018 across two programs. Of those supported or funded, 126 ports have been installed to-date. MCE is coordinating with PG&E on their EV Charge Network program and providing a supplemental rebate to customers who participated in that program. MCE is also managing a stand-alone 3-year EV charging program known as MCEv Charging that actively facilitates the alignment of available funding sources and technical assistance for commercial and multi-family customers interested in charging infrastructure for the primary use of their employees and tenants. MCEv Charging was re-launched in May 2019 with an increased per port rebate to cover more of the installation costs, a rebate bonus for opting up to Deep Green, and expanded technical assistance.

MCE is also offering a program that includes a rebate for income-qualified customers interested in purchasing a new or used electric vehicle with the goal of increasing access for customer groups that may otherwise have difficulty paying for an electric vehicle.

Energy Efficiency (EE)

Alongside the IOUs and Regional Energy Networks, MCE serves as one of California’s administrators of ratepayer-funded EE programs. Ratepayer funding is derived through collection of the public purpose program charge from all customers, including those served by both CCAs and IOUs; disposition of public purpose program funds is administered by the CPUC. MCE has received CPUC funding approval for EE programs to be administered through 2025 and currently administers programs in multifamily, single family, commercial, agriculture and industrial sectors. Furthermore, MCE administers the Low-Income Families and Tenants (“LIFT”) Program, which serves income qualified, multifamily properties that include a fuel switching component to incentivize property owners to replace gas-fired space and water heaters. The forecasted cumulative savings of MCE-administered EE programs are based on average lifecycle savings and are reflected below in Figure 6.

Figure 6: MCE Cumulative Energy Efficiency Impacts (GWh)



MCE also supports multiple workforce development initiatives to encourage the growth of green-collar jobs. Through the approval of its Energy Efficiency Business Plan, MCE has been able to allocate non-resource dollars to fund workforce development initiatives beyond the Multifamily Energy Savings Direct Install service. MCE is also coordinating closely with PG&E to maximize community benefits and ensure gaps are filled.

Behind the Meter Energy Storage and Resilience

MCE is exploring opportunities to partner with vendors, offer financing and deploy rate design strategies to encourage the adoption of behind the meter storage. As mentioned above (see “Building Efficiency Optimization” program), MCE and its project partners received funding from the CEC to demonstrate the optimal deployment of behind the meter distributed energy resources across a CCA service area. This project will result in a replicable software tool that can provide the data needed to develop programming. Early versions of the tool are focusing on the benefits of storage for existing NEM customers. The project is expected to be complete in June of 2020.

Furthermore, MCE sees storage as an important component of climate resilience. As the impacts of climate change on its service area are growing, MCE will continue collaborating with local, state, and national agencies to make our communities stronger and greener. This includes making long-term investments that will reduce strain on the grid, including resource adequacy, demand savings, load scheduling, and grants to optimize resources for customers with existing solar-powered battery storage. MCE is also working with partners to increase resiliency and reduce emissions for local hospitals, fire stations, and other vital agencies that rely on diesel-powered back-up generators.

Net Energy Metering (NEM) and Rooftop Solar Rebates

Through its NEM program, MCE supports customer-sited distributed generation within its service area. MCE’s NEM program offers incentives not typically found in utility programs, including rollover of NEM generation credits from year-to-year (up to a cap of \$5,000 for most customer classes), as well as the opportunity to receive a cash payment for the retail value of those credits. In 2018, eligible credit balances for cash-out exceeded \$1.8 million, with some of the largest beneficiaries including school districts and other public agencies. MCE’s NEM program currently includes more than 33,000 customers

(7.1% of all MCE accounts) with aggregate installed renewable generating capacity of approximately 337 MW.

Beyond NEM, MCE incentivizes local rooftop solar development for low income customers. MCE has a strong partnership with California's Single Family Affordable Solar Housing ("SASH") program administrator, GRID Alternatives. MCE contributes \$900 per solar installation to low-income single family customers who qualify for GRID Alternative's service or are CARE customers. By leveraging multiple sources of funding, GRID Alternatives installs these systems in disadvantaged communities at little-to-no cost for the customer. In addition to MCE's single-family solar rebate program, MCE also offers \$0.41 per watt (AC) rebate to low-income multifamily properties that install solar which has a portion of the benefits allocated toward their tenants. From 2012-2019, MCE allocated \$535,000 toward these two rebate programs and has supported the installation of 220 residential solar PV systems on low-income multifamily homes, representing 519 kW of new, local renewable capacity and helping low-income families to pay less on their monthly energy bills.

Disadvantaged Communities

Disadvantaged Community Solar Program

MCE is collaborating with the CPUC, other CCAs and the Investor-Owned Utilities to develop a community solar program (and corresponding implementation rules) focused on customers in disadvantaged communities ("DACs"). The DAC Green Tariff, a CPUC-funded program, offers low-income customers in disadvantaged communities a 20% discount on their electric bill when subscribing to a community solar project and offsetting 100% of their electric usage with solar energy. Under the program, 70 MW of new solar will be developed in DACs in PG&E's service territory. MCE expects to implement this program in 2020.

Community Power Coalition

To facilitate direct community feedback in the development, progress, and evolution of all its customer programs, MCE engages the Community Power Coalition. Formed in 2014, the Community Power Coalition seeks to represent the interests of underrepresented and historically marginalized communities through collaboration and open dialogue with MCE. As of June 2019, this Coalition is comprised of 34 local organizations and meets every other month to discuss regulatory and legislative issues, build community awareness of new MCE programs and policies, and provide timely and specific feedback on MCE's wide assortment of programs.

III. Planning Policies

MCE policy, established by MCE's founding documents and directed on an ongoing basis by MCE's Board, guides the development of this IRP and related procurement activities. MCE's key resource planning policies are as follows:

- Reduce GHG emissions and other pollutants associated with the electric power sector through increased use of renewable, GHG-Free, and low-GHG energy resources.
- Maintain competitive electric rates and increase control over energy costs through management of a diversified resource portfolio.
- Benefit the local economy by offering competitive electricity rates and customer programs and investing in infrastructure, energy, and workforce development programs within MCE's service area.
- Help customers reduce energy consumption and electric bills by supporting and administering enhanced customer EE, cost-effective distributed generation, and other demand-side programs.
- Enhance system reliability through investments in supply- and demand-side resources.
- Actively monitor and manage operating and market risks to promote MCE's continued financial strength and stability.
- Support supplier and workforce diversity as permitted by law.

The IRP translates these broad policy objectives into a more specific energy procurement strategy, taking into consideration MCE's projected customer needs and existing resource commitments over the Planning Period.

Regulatory Considerations

Renewable Portfolio Standard (RPS)

California's RPS requires California load serving entities to supply their retail sales with minimum quantities of eligible renewable energy. As shown in Table 4 below, the RPS requirements have increased over the years, and such requirements (expressed as percentages of retail sales) are enforced within compliance periods. For each compliance period, load-serving entities ("LSEs"), such as MCE, are required to meet the weighted average of the RPS requirements for that period, with retail sales providing the weights. For example, in compliance period #3, LSEs are required to supply their retail sales with at least the following portion of renewable energy: $[(2017 \text{ sales} \times 27\%) + (2018 \text{ sales} \times 29\%) + (2019 \text{ sales} \times 31\%) + (2020 \text{ sales} \times 33\%)] / [2017 \text{ through } 2020 \text{ sales}]$.

Table 4: RPS Requirements by Compliance Period

Year	Compliance Period	RPS Requirement (% of Retail Sales)
2011	1	20.0
2012	1	20.0
2013	1	20.0
2014	2	21.7
2015	2	23.3
2016	2	25.0
2017	3	27.0
2018	3	29.0
2019	3	31.0
2020	3	33.0
2021	4	35.8
2022	4	38.5
2023	4	41.3
2024	4	44.0
2025	5	46.7
2026	5	49.3
2027	5	52.0
2028	6	54.7
2029	6	57.3
2030	6	60.0

In order to supply their retail sales with minimum portions of renewable energy, load-serving entities must acquire and retire renewable energy credits ("RECs"). Each REC represents the environmental/renewable attributes associated with 1 MWh of eligible renewable energy and is created when the electricity is generated; accordingly, each REC is assigned a vintage year and month. RECs are created in a database known as the Western Renewable Energy Generation Information System ("WREGIS"), which is used across the Western Interconnection to track the environmental/renewable attributes of wholesale electricity. When acquiring and retiring RECs to meet its RPS requirements, MCE must also comply with additional requirements related to three Portfolio Content Categories (PCCs), defined as follows:

- **PCC 1:** RECs bundled with electricity from renewable facilities with a first point of interconnection within a California Balancing Authority ("CBA"), or RECs from facilities that schedule electricity into a CBA, and without substitute energy. In other words, these are RECs that are bundled with electricity - all coming from the renewable energy facility. If that facility is outside a CBA, the electricity must be scheduled into the CBA, and only the fraction of the schedule actually generated by the renewable facility may count (i.e., any Ancillary Services needed to support the schedule are not counted).
- **PCC 2:** RECs bundled with electricity from renewable facilities, where the physical renewable generation is sunk outside of a CBA, and substitute energy is imported into a CBA within the same calendar year. In other words, these are RECs that are bundled with electricity, but the electricity scheduled into the CBA does not have to come from the renewable energy facility. Instead, the electricity is provided by a substitute facility, as long as the electricity is scheduled into the CBA within the same calendar year.
- **PCC 3:** RECs produced by a renewable facility, but unbundled and sold without the associated electricity.

In accordance with its RPS requirements, MCE must acquire and retire RECs in line with PCC-related restrictions. Table 5 below shows the PCC-related restrictions for the current compliance period.

Table 5: RPS PCC Restrictions for Compliance Period 3

Year	Compliance Period	RPS Requirement (% of Retail Sales)	PCC 1 Minimum (% of RPS)	PCC 3 Maximum (% of RPS)
2017	3	27.0	75	10
2018	3	29.0	75	10
2019	3	31.0	75	10
2020	3	33.0	75	10

Long-Term Contracting Obligation

Starting with Compliance Period 4 (which begins 1/1/2021), at least 65% of the RECs retired for the purpose of meeting the Procurement Quantity Requirement (“PQR”) must come from contracts that are 10 or more years in duration, pursuant to SB 350.

Senate Bill 100

Senate Bill (“SB”) 100, signed by California’s Governor in September 2018, directs all LSEs to procure 60% of their portfolios from RPS-eligible resources by 2030 (as explained in the RPS section above). SB 100 also directs LSEs to source 100% of their retail sales from zero-carbon resources (or eligible renewable resources) by 2045. In January 2021, California regulators (CEC, CARB, CPUC) are required to issue a joint agency report to clarify which specific resources should count toward meeting the 2045 requirement.

Power Source Disclosure

AB 1110, signed into law in September of 2016, directs the CEC to adopt a methodology for the calculation of GHG emissions intensity for each electricity product offered by a retail supplier. The CEC has issued multiple draft implementation proposals with the opportunity for stakeholders to comment on each iteration. Based on pre-rulemaking activities thus far, it is likely that PCC 2 resources will be assigned GHG emissions based on the intensity of the substitute power that is being imported into California. If the CEC does move forward with this proposed accounting methodology, it would have a significant impact on the value of PCC 2 renewables. The CEC is also proposing to disaggregate ACS power into its underlying technology types (the vast majority being large hydroelectric). These proposed regulations are still subject to change until the CEC has formally adopted them.

Resource Adequacy (RA)

Resource Adequacy (“RA”), a California program jointly administered by the CPUC, CEC and CAISO, directs LSEs to secure forward capacity that then must be offered into the CAISO’s Day-Ahead and Real-Time markets, ensuring that such markets will be able to clear (i.e., there will be enough supply in the right locations and with sufficient ramping capability to meet load). The RA program facilitates the formation of a bilateral capacity market among LSEs and generation owners that determines capacity payments, which can be used to offset a portion of fixed generation costs not recovered in the energy market. The RA program is comprised of three products: (1) System RA; (2) Local RA; and (3) Flexible RA.

In order to meet its System RA requirements, MCE must demonstrate that it has secured capacity equal to 115% of its expected peak load for each month of the year. However, instead of making such a demonstration all at once, MCE is instead required to make a year-ahead filing as well as twelve individual month-ahead filings. For the year-ahead filing (October 31st of the preceding year), MCE must

demonstrate 90% of the 115% requirement for the coming year's five summer months: May through September. For the 12 monthly filings (each submitted 45 days in advance of the month), MCE must demonstrate 100% of the 115% requirement. For reference, the 115% requirement is often referred to as the expected peak load plus a 15% "planning reserve margin." When demonstrating System RA capacity, MCE must count only the "Net Qualifying Capacity" of each resource it includes in its filings. The Net Qualifying Capacity ("NQC") of a resource, published by the CAISO, is the capacity (one number for each month of the year) that can be relied upon to meet that month's peak load system conditions. For wind and solar resources, the NQC calculations must consider the intermittent and seasonal nature of such resources and are based on an Effective Load Carrying Capacity ("ELCC") methodology.

In order to meet its Local RA requirements, MCE must demonstrate that it has secured capacity in specific transmission-constrained (i.e., "Local") areas equal to its assigned share of the CAISO's need for each month of the year. In accordance with CPUC Decision 19-02-022, MCE must procure Local RA three years in advance, beginning with the fall 2019 compliance filing, and MCE must demonstrate 100% of its year 1 requirement, 100% of its year 2 requirement and 50% of its year 3 requirement. For example, MCE must demonstrate on 10/31/19 that it has secured 100% of its 2020 and 2021 Local RA requirements and 50% of its 2022 Local RA requirement. The assigned requirement for each local area is one number for the entire year, but MCE must show that it has secured enough capacity in each month to meet this number. The CAISO has established a list of seven local areas in PG&E's transmission area: (1) Humboldt; (2) North Coast/North Bay; (3) Sierra; (4) Stockton; (5) Greater Bay Area; (6) Greater Fresno; and (7) Kern.

In order to meet its Flexible RA requirements, MCE must demonstrate that it has secured Flexible capacity equal to its assigned share of the CAISO's flexibility need (based in part on the largest expected three-hour ramp of system load) for each month of the year. However, instead of making such a demonstration all at once, MCE is instead required to make a year-ahead filing as well as twelve monthly filings. For the year-ahead filing (October 31st of the preceding year), MCE must demonstrate 90% of its assigned flexible capacity requirement for each month of the coming year. For the twelve individual monthly filings (each submitted 45 days in advance of the month), MCE must demonstrate 100% of its assigned flexible capacity requirement. When demonstrating Flexible RA capacity, MCE must count only the "Effective Flexible Capacity" of each resource it includes in its filings. At a high level, the Effective Flexible Capacity ("EFC") of a resource, published each year by the CAISO, is the capacity (one number for each month of the year) that can be relied upon to help meet that month's system ramping needs. For this reason, only resources that can ramp and sustain energy output for at least three hours are eligible to receive an EFC value. Flexible RA is offered in the market as a bundled product, so LSEs will purchase either System or Local resources which are coupled with an EFC value.

Energy Storage

The California Energy Storage Bill, AB 2514, was signed into law in September of 2010, and, as a result, the CPUC established energy storage targets for IOUs, CCAs, and other LSEs in September 2013. The applicable CPUC Decision established an energy storage procurement target for CCAs and electric service providers equal to 1% of their forecasted 2020 peak load. Based upon current load forecasts, the decision requires MCE to install 11 MW of energy storage no later than 2024. Beginning on January 1, 2016, and every two years thereafter, MCE must file an advice letter demonstrating compliance with this requirement, progress toward meeting this target, and a description of the methodology for ensuring projects are cost-effective.

In Decision ("D") 17-04-039, the CPUC adopted an "automatic limiter" that modifies the CCA programs' energy storage obligation. By applying the limiter, each CCA's total energy storage obligation should not exceed the energy storage obligation of the incumbent IOU, including any IOU-procured storage resources that receive cost recovery from the CCA's customers through distribution rates and non-bypassable charges.

MCE Light Green Procurement Targets

99% GHG-Free by 2022

Reducing GHG emissions is at the heart of MCE’s mission. With this in mind, MCE is structuring a Light Green portfolio that will be approximately 99% GHG-Free¹¹ in 2022 and beyond, subject to market and/or regulatory changes. To structure such a clean Light Green portfolio by 2022, MCE will procure three products: (1) RPS-eligible renewable energy; (2) large hydroelectric energy; and (3) Asset Controlling Supplier energy, the vast majority of which is large hydroelectric.¹² With respect to the first product (RPS-qualifying renewable energy), which will continue to account for at least 60% of MCE’s Light Green portfolio (and 85% by 2029), MCE is planning to phase out its use of PCC 2 renewables by 2022 and will ramp up its use of PCC 1 renewables to make up the difference. This steady phase-out of PCC 2 renewables is a decision by MCE to prepare for the most likely scenario of AB 1110 implementation (explained in the regulatory section above), where PCC 2 renewables will be assigned the GHG emissions of the associated substitute power.

For its Light Green customers, MCE is targeting a 99% GHG-Free portfolio and not a 100% GHG-Free portfolio for the following reasons: (1) as part of its PCC 1 renewable energy portfolio, MCE has contracts for geothermal and biofuel that are known to produce “small” or trace amounts of carbon dioxide and other GHGs during electric power generation;¹³ (2) MCE procures Asset Controlling Supplier (“ACS”) energy that includes small portions of GHG-emitting power. A significant portion of the large hydroelectric power in the Pacific Northwest is embedded in ACS and MCE has determined that the benefits of this hydroelectric supply offsets the minimal emissions in ACS.

MCE’s Light Green portfolio targets appear in Table 6a below. Actual content percentages may differ from projections if resource availability or market conditions preclude cost-effective procurement or if annual load comes in higher or lower than expected.

Table 6a: MCE Light Green Portfolio Targets

10-Year Light Green Portfolio Targets (%)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
PCC 1 Renewable	48%	54%	60%	60%	60%	65%	70%	75%	80%	85%
PCC 2 Renewable	12%	6%	0%	0%	0%	0%	0%	0%	0%	0%
Large Hydro + ACS	34%	37%	40%	40%	40%	35%	30%	25%	20%	15%
CAISO System Power	6%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Total Renewable	60%	60%	60%	60%	60%	65%	70%	75%	80%	85%
Total Renewable + Large Hydro + ACS	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%

Workforce and Supplier Diversity

MCE is committed to supporting the economic health and sustainability of communities in its service area and seeks opportunities to contract with businesses that are historically underrepresented in utilities’ procurement of energy resources, goods, and services. MCE’s guidelines for diversity in procurement

¹¹ Beginning with MCE’s 2019 results, MCE’s Light Green GHG-Free percentage will be derived as follows: [MCE Light Green MT CO₂e, per CEC Power Content Label] / [(MWh of MCE Light Green Retail Sales) x (0.428 MT CO₂e/MWh)]. For reference, 0.428 MT CO₂e/MWh is the emissions factor of unspecified electricity, per the California Air Resources Board.

¹² The California Air Resources Board (CARB) recognizes three asset-controlling suppliers: Bonneville Power Administration, Powerex and Tacoma Power. On its website, CARB publishes the emissions factors for each of these three suppliers: <https://ww2.arb.ca.gov/mrr-ac>

¹³ Technology-specific emissions factors can be found in Table A.III.2 of the 2014 IPCC report available at: https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_annex-iii.pdf.

support MCE's efforts to procure energy resources, goods, and services from historically underrepresented and/or economically disadvantaged businesses and communities as allowed by law.

MCE will facilitate and encourage diversity and a sustainable workforce through its support for:

1. Fair compensation in direct hiring, renewable development projects, customer programs, and procurement services;
2. Development of locally generated renewable energy within the MCE service area;
3. Direct use of union members from multiple trades;
4. Quality training, apprenticeship, and pre-apprenticeship programs;
5. Direct use of businesses local to the MCE service area;
6. Development of California based job opportunities;
7. Business and workforce initiatives located in low-income and disadvantaged communities;
8. Direct use of Disabled Veteran-owned Enterprises ("DVBE") and LGBT-owned Business Enterprises;
9. Direct use of green and sustainable businesses; and
10. Use of direct hiring practices that promote diversity in the workplace.

In line with these workforce priorities, MCE has various requirements for employing local labor, including apprentices, providing prevailing wages, and complying with project labor agreements. In an effort to further MCE's tracking and reporting of labor practices and General Order 156 which monitors suppliers diversity of its energy providers, in 2018 MCE used the CPUC's Supplier Diversity Clearinghouse to engage certified suppliers. MCE has also added an optional "Supplier Diversity and Labor Practices" questionnaire to its Open Season offer form to request that power supply contractors voluntarily disclose their certification status. In compliance with Proposition 209, MCE explicitly does not give preferential treatment to bidders based on race, sex, color, ethnicity, or national origin. If such information is provided in the optional questionnaire, this information does not impact the Open Season selection process. Additionally, MCE has added workforce and diverse supplier reporting requirements to its form Power Purchase Agreement. SB 255 (Bradford) was recently signed into law by the Governor; CCAs will be required to submit an annual plan to the CPUC for increasing procurement from small, local, and diverse business enterprises, as well as reporting on diverse suppliers. MCE was supportive of this bill and will submit its plan and report to the CPUC when requested.

IV. Resources

Existing Resource Commitments

As of September 15, 2019, MCE has active contracts with approximately 60 unique counterparties which supply MCE with renewable energy, large hydroelectric/ACS energy, CAISO load hedging and Resource Adequacy. Table 7 directly below lists MCE's active contracts with the 40 unique counterparties which provide renewable energy, large hydroelectric/ACS energy and CAISO load hedging (via fixed-price forward contracts).

Table 7: MCE Portfolio of Resources as of 9/15/2019¹⁴

Counterparty	Generation Facility	Generation Technology	Contract MW	Term	Annual GWh	Generation Location
Renewables: Contract Terms ≥ 10 years						
BayWa	Strauss Wind	Wind	98.83	2020-2035	300	Lompoc, CA
Calpine	Geysers	Geothermal	10	2017-2026	88	Lake Co, Sonoma Co, CA
CMSA	CMSA (FIT)	Solar PV	0.75	2019-2039	1.3	San Rafael, CA
ConEdison	Great Valley Solar 1	Solar PV	100	2018-2033	279-290	Fresno Co, CA
Dominion	Cottonwood -Buck Institute	Solar PV	1	2016-2041	1.7	Novato, CA
Dominion	Cottonwood-City of Corcoran	Solar PV	11	2015-2040	25-30	Kings Co, CA
Dominion	Cottonwood-Goose Lake	Solar PV	12	2015-2040	29-34	Kern Co, CA
DRES Quarry, LLC	Cooley Quarry 1 (FIT)	Solar PV	0.99	2017-2037	2.9	Novato, CA
DRES Quarry, LLC	DRES Quarry 2.4 (FIT)	Solar PV	0.1	2019-2038	0.30	Novato, CA
EBMUD	Pardee & Camanche Powerhouses	Small Hydro	34	2016-2025	70	Mokelumne River, CA
EDF	Desert Harvest	Solar PV	80	2020-2040	237-262	Riverside Co, CA
First Solar	Little Bear 1 Solar	Solar PV	40	2020-2040	99-109	Fresno Co, CA
First Solar	Little Bear 3 Solar	Solar PV	20	2020-2040	50-55	Fresno Co, CA
First Solar	Little Bear 4 Solar	Solar PV	50	2020-2040	124-137	Fresno Co, CA
First Solar	Little Bear 5 Solar	Solar PV	50	2020-2040	124-137	Fresno Co, CA
G2Energy	G2 Hay Road	Landfill Gas	1.4	2013-2033	11	Solano Co, CA
G2Energy	G2 Ostrom Road	Landfill Gas	1.7	2013-2031	12	Yuba Co, CA
Genpower	Energy 2001 - Lincoln Landfill	Landfill Gas	4.8	2013-2033	27	Lincoln, CA
Hayworth-Fabian LLC	Oakley RV & Boat Storage (FIT)	Solar PV	0.99	2018-2037	1.8	Oakley, CA
Larkspur Real Estate Partnership 1	Cost Plus Plaza Larkspur (FIT)	Solar PV	0.261	2016-2036	0.5	Larkspur, CA
Northshore Solar Partners LLC	Freethy Industrial Park 1 (FIT)	Solar PV	0.998	2016-2036	1.8	Richmond, CA
Northshore Solar Partners LLC	Freethy Industrial Park 2 (FIT)	Solar PV	0.998	2016-2036	1.8	Richmond, CA
Recurrent Energy	RE Mustang 4	Solar PV	30	2018-2032	79-84	Fresno Co, CA
RP Napa Solar 1, LLC	American Canyon A (FIT)	Solar PV	0.99	2019-2039	2.6	Napa, CA
RP Napa Solar 1, LLC	American Canyon B (FIT)	Solar PV	0.99	2019-2039	2.6	Napa, CA
RP Napa Solar 1, LLC	American Canyon C (FIT)	Solar PV	0.99	2019-2039	2.6	Napa, CA
RP Napa Solar 2, LLC	Soscol Ferry Solar C (FIT)	Solar PV	0.99	2019-2039	2.6	Napa, CA
RP Napa Solar 2, LLC	Soscol Ferry Solar D (FIT)	Solar PV	0.99	2019-2039	2.6	Napa, CA
RP Napa Solar 3, LLC	Silveira Ranch A (FIT)	Solar PV	0.999	2020-2040	2.6	Novato, CA
RP Napa Solar 3, LLC	Silveira Ranch B (FIT)	Solar PV	0.999	2020-2040	2.6	Novato, CA
RP Napa Solar 3, LLC	Silveira Ranch C (FIT)	Solar PV	0.999	2020-2040	2.6	Novato, CA
San Rafael Airport LLC	San Rafael Airport (FIT)	Solar PV	0.972	2012-2032	1.7	San Rafael, CA
San Rafael Airport LLC	San Rafael Airport 2 (FIT)	Solar PV	0.972	2019-2038	2	San Rafael, CA
Small World Trading Co.	EO Products (FIT)	Solar PV	0.056	2018-2037	0.1	San Rafael, CA
sPower	Antelope Expansion 2	Solar PV	105	2018-2038	284-312	Mojave Desert, CA
sPower	MCE Solar One	Solar PV	10.5	2017-2037	22	Richmond, CA
Terra Gen	Voyager Wind III	Wind	42	2018-2030	138	Mojave, CA
Waste Management	Redwood Landfill	Landfill Gas	3.5	2017-2037	30.7	Novato, CA

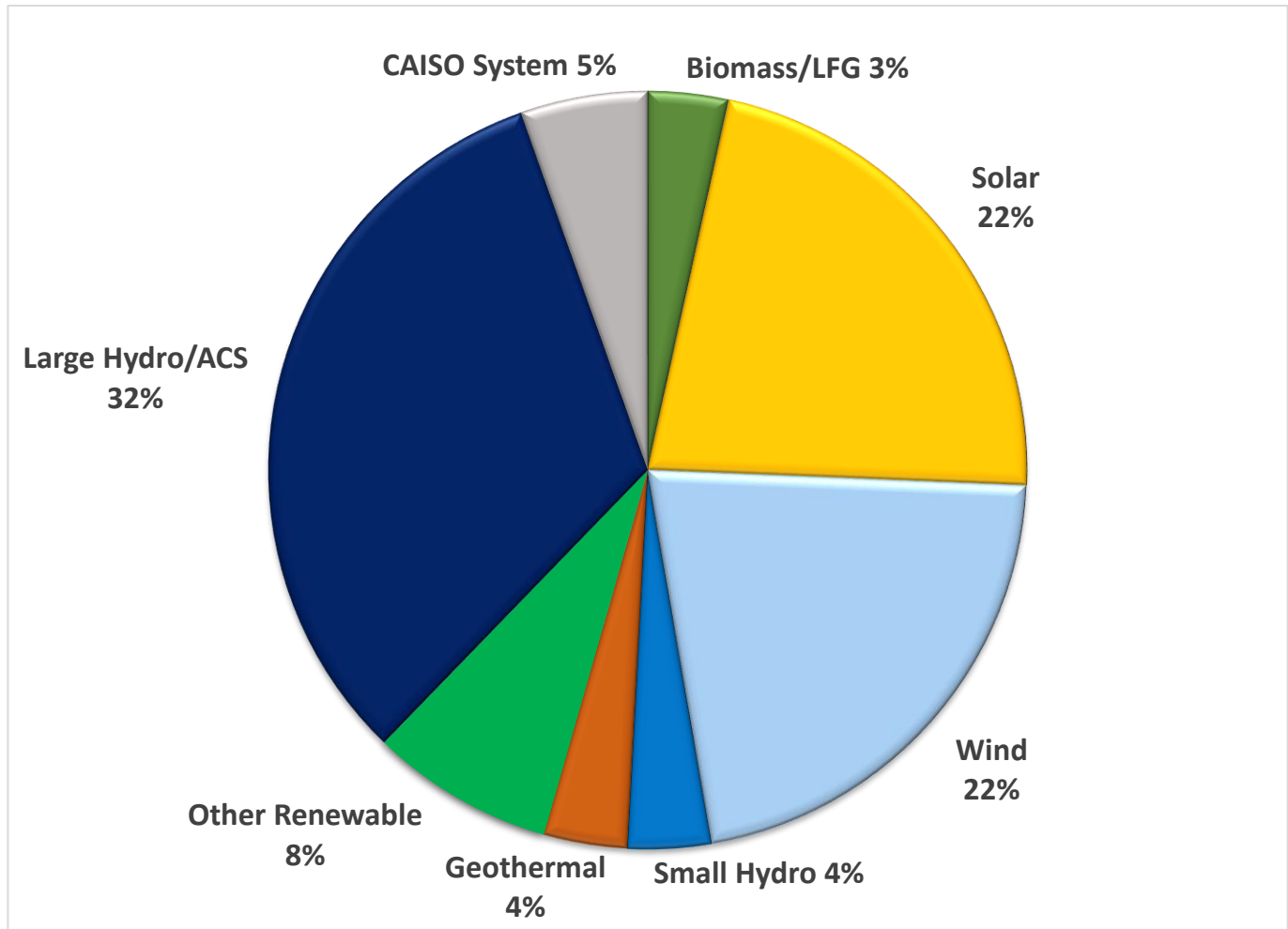
¹⁴ Table 7 above excludes MCE's RA-only contracts but includes all other active contracts

Counterparty	Generation Facility	Generation Technology	Contract MW	Term	Annual GWh	Generation Location
Renewables: Contract Terms < 10 years						
3 Phases Renewables Inc.	Wind Portfolio	PCC 2 Wind	N/A	2018-2019	150-160	Colorado
3 Phases Renewables Inc.	Renewables Portfolio	PCC 2 Renewables	N/A	2020	75-100	Western Interconnection
ConEdison	Solar Portfolio	PCC 1 Solar PV	N/A	2018-2019	37-50	California
DTE	Renewables Portfolio	PCC 2 Renewables	N/A	2019	155	Western Interconnection
DTE	Renewables Portfolio	PCC 2 Renewables	N/A	2019	110	Western Interconnection
Morgan Stanley	PCC 1 Wind Portfolio	PCC 1 Wind	N/A	2018-2020	75-90	Washington, Oregon
Morgan Stanley	PCC 2 Wind/Biomass Portfolio	PCC 2 Wind, Biomass	N/A	2019	50	Washington, Oregon, Idaho
Morgan Stanley	PCC 2 Wind/Biomass Portfolio	PCC 2 Wind, Biomass	N/A	2020-2021	18-45	Washington, Oregon, Idaho
NextEra	FPL Energy Green Power Wind	PCC 1 Wind	15.5	2019-2023	25.2	Riverside Co, CA
PG&E	PCC 1 Renewables Portfolio	PCC 1 Renewables	N/A	2019-2020	200-300	California, Nevada, Arizona
Portland General	PCC 2 Wind Portfolio	PCC 2 Wind	N/A	2019	150	Washington, Oregon
Powerex	PCC 2 Wind/Biomass Portfolio	PCC 2 Wind, Biomass	N/A	2017-2019	25-125	BC, Washington
Powerex	PCC 2 Wind Portfolio	PCC 2 Wind	N/A	2019	75	BC, Washington
Powerex	PCC 1 Wind Portfolio	PCC 1 Wind	N/A	2019-2020	25-50	British Columbia
SCE	PCC 1 Solar/Wind Portfolio	PCC 1 Solar, Wind	N/A	2019-2020	200	California, Nevada
Shell Energy North America	PCC 2 Portfolio	PCC 2 Renewables	N/A	2019	100	Western Interconnection
TGP Energy Management, LLC	PCC 1 Solar/Wind Portfolio	PCC 1 Solar, Wind	N/A	2018-2020	300	California, Arizona
Turlock Irrigation District	PCC 1 Small Hydro Portfolio	PCC 1 Small Hydro	N/A	2019-2020	18	California
Large Hydroelectric / ACS						
Bonneville Power Administration	BPA ACS	BPA ACS	25	2020	219.6	Pacific Northwest
Brookfield Renewable Partners	Large Hydro/ACS Portfolio	Large Hydro/ACS	N/A	2019	126	Pacific Northwest
Brookfield Renewable Partners	Large Hydro/ACS Portfolio	Large Hydro/ACS	N/A	2019	55	Pacific Northwest
Direct Energy Business Marketing	BPA ACS	BPA ACS	N/A	2019	400-408	Pacific Northwest
Morgan Stanley	Large Hydro Portfolio	Large Hydro	N/A	2018-2020	160-330	Washington, Idaho
Shell Energy North America	Colgate & Narrows 2 Powerhouses	Large Hydro	N/A	2019	360	California
Shell Energy North America	Colgate & Narrows 2 Powerhouses	Large Hydro	N/A	2020	150	California
Shell Energy North America	Colgate & Narrows 2 Powerhouses	Large Hydro	N/A	2023	200	California
Shell Energy North America	Colgate & Narrows 2 Powerhouses	Large Hydro	N/A	2024	200	California
Tenaska Power Services	Middlefork & Ralston Powerhouses	Large Hydro	N/A	2018-2022	300-600	California
TransAlta Energy Marketing US	Large Hydro/ACS Portfolio	Large Hydro/ACS	N/A	2019	102	Pacific Northwest
Western Area Power Administration	Central Valley Project	Large Hydro	N/A	2015-2024	25	California
Fixed Price Forward Contracts						
Direct Energy Business Marketing	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2018-2020	310-483	N/A
Direct Energy Business Marketing	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2019	667	N/A
Direct Energy Business Marketing	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2021	109.5	N/A
Exelon Generation Company	N/A (Fixed Payment for NP15 Revenue)	N/A	50	2018-2019	438	N/A
Exelon Generation Company	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2020	461	N/A
Morgan Stanley	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2018-2020	188-588	N/A
Morgan Stanley	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2019-2020	208-216	N/A
Morgan Stanley	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2021-2022	332-472	N/A
Shell Energy North America	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2018-2020	623-739	N/A
Shell Energy North America	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2019	366	N/A
Shell Energy North America	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2019-2020	168-448	N/A
Shell Energy North America	N/A (Fixed Payment for NP15 Revenue)	N/A	Variable	2019-2022	353-950	N/A

Projected 2020 Resource Mix

As mentioned in Chapter 3 above, MCE is anticipating that 94% of its 2020 Light Green portfolio will be sourced from renewables, large hydroelectric and ACS. When aggregated with its Deep Green and Local Sol portfolios (both of which are 100% renewable), MCE anticipates that 95% of its total 2020 retail sales will be sourced from renewables, large hydroelectric and ACS. Figure 7 below illustrates MCE's anticipated 2020 resource mix for its retail sales.

Figure 7: MCE 2020 Estimated Resource Mix¹⁵



Resource Needs

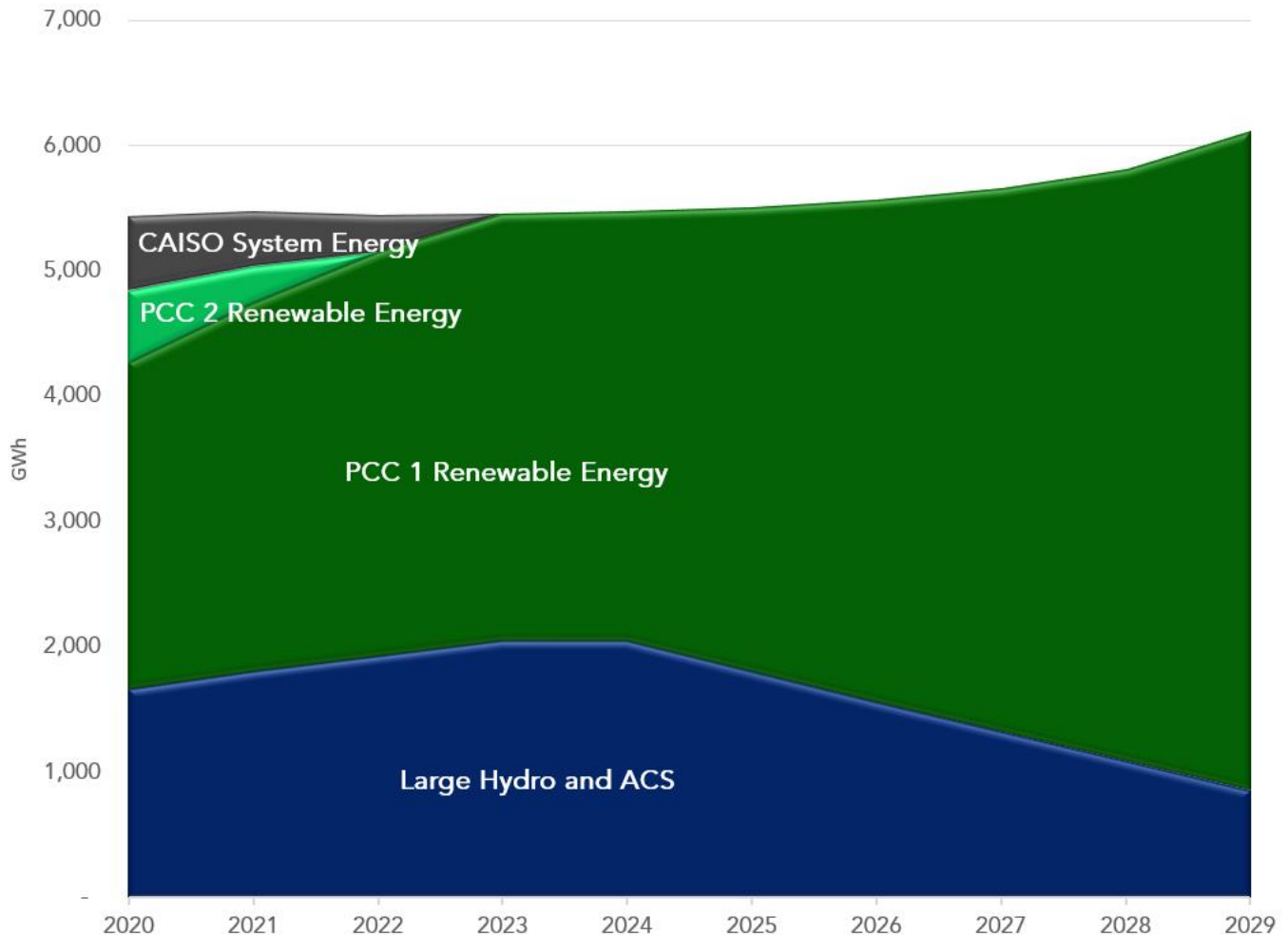
Beyond its current contractual commitments, MCE will procure additional energy products, as necessary, to ensure that the future energy needs of its customers are met in a clean, reliable, and cost-effective manner. This section sets forth MCE's planned resource volumes and quantifies the net resource need or "open position" that remains after accounting for production from MCE's existing resource portfolio. As explained above, MCE has established procurement targets for renewable energy, large hydroelectric and ACS, and MCE has also established targets for planning reserves. To the extent that MCE's energy needs are not fulfilled through the use of renewable, large hydroelectric and ACS, it should be assumed that such supply will be sourced from CAISO system power, which represents energy purchases from the wholesale market that are not directly associated with specific generators.

¹⁵ Figure 7 includes all supply to serve retail sales for the Light Green, Deep Green and Local Sol product offerings.

Renewable Resources

MCE plans to provide Light Green customers with energy that is at least 60% renewable through 2024 and 85% renewable by 2029. Importantly, MCE plans to change the underlying composition of this renewable energy by eliminating its use of PCC 2 renewables and relying completely on PCC 1 renewables in 2022 and beyond. MCE will also procure PCC 1 renewable energy for its Deep Green customers, and MCE is projecting that the number of such Deep Green customers will grow significantly over the planning horizon. In summary, MCE is planning to procure significant quantities of PCC 1 renewable energy, as Figure 8 below illustrates.

Figure 8: MCE Procurement Targets (GWhs), 2020-2029¹⁶



RPS Open Positions

MCE's renewable power content exceeds the state's minimum RPS requirements and will continue to do so throughout the Planning Period. MCE has executed a number of long-term power purchase agreements ("PPAs") with new, California-based generating facilities that will produce PCC 1-eligible renewable energy.¹⁷ To supplement its core procurement of PCC 1 resources under long-term contracts,

¹⁶ Figure 8 displays the types of resources required to meet MCE's loss-adjusted load (i.e., load including the power lost to the distribution system).

¹⁷ Historically, MCE has contracted with PCC 1 resources located within California; however, some resources located outside of California are eligible for PCC 1, typically through direct interconnection or firm transmission rights to the CAISO. Whereas MCE has an established preference for in-state resources, it may consider contracting with out-of-state, PCC 1-qualified resources – to the extent that they offer increased value or other desirable portfolio attributes – during the Planning Period.

MCE engages in short-term contracts for renewable energy supplies to balance and optimize its portfolio. As shown in Table 8 below, MCE has secured contracts for renewable energy volumes well in excess of applicable RPS procurement requirements.

Table 8: MCE RPS Compliance Energy Balance, 2020-2029

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Retail Sales (GWh)	5,127	5,164	5,135	5,143	5,162	5,198	5,255	5,344	5,482	5,768
State RPS %	33%	36%	39%	41%	44%	47%	49%	52%	55%	57%
RPS Energy Required (GWh)	1,692	1,849	1,977	2,124	2,271	2,427	2,591	2,779	2,998	3,305
RPS Energy Contracted (GWh)	2,256	2,198	2,191	2,184	2,153	2,121	2,069	1,974	1,968	1,960
RPS Net Short/(Long)	(565)	(349)	(214)	(60)	119	307	522	805	1,031	1,346
RPS Category 1 Required (GWh)	1,269	1,387	1,483	1,593	1,704	1,821	1,943	2,084	2,249	2,479
RPS Category 1 Contracted (GWh)	2,256	2,198	2,191	2,184	2,153	2,121	2,069	1,974	1,968	1,960
RPS Category 1 Net Short/(Long)	(988)	(811)	(708)	(591)	(449)	(300)	(126)	110	281	519

Voluntary Renewable Open Positions

Voluntary renewable energy volumes reflect purchases that exceed applicable RPS mandates. With respect to MCE, these voluntary purchases are necessary to meet the targeted renewable energy supply for Light Green customers (60% through 2024, ramping up to 85% by 2029) and the 100% renewable energy supply for Deep Green customers. As shown in Table 9 below, MCE needs additional renewable energy volumes to meet its targets for Light Green and Deep Green customers.

Table 9: MCE Renewable Energy Balance, 2020-2029

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Light Green Renewable Energy Target (%)	60%	60%	60%	60%	60%	65%	70%	75%	80%	85%
Light Green Renewable Energy Target (GWh)	2,919	2,909	2,888	3,062	3,070	3,346	3,640	3,965	4,341	4,864
Deep Green Incremental Renewable Energy Target (GWh)	278	335	342	348	355	363	370	377	385	392
Contracted Renewable Energy (GWh)	2,256	2,198	2,191	2,184	2,153	2,121	2,069	1,974	1,968	1,960
Renewable Net Short/(Long)	940	1,046	1,038	1,226	1,273	1,587	1,942	2,368	2,758	3,296

Large Hydroelectric and ACS

For its Light Green customers, MCE has outlined a 2020 portfolio, 94% of which will be sourced from renewables, large hydroelectric and ACS. By 2022, MCE is planning to increase that figure to 100% by ramping up its use of large hydroelectric and ACS power from 34% in 2020 to 40% in 2022. Then starting in 2025, MCE plans to steadily ramp down its use of large hydroelectric and ACS power as it correspondingly ramps up its use of PCC 1 renewables. MCE's large hydroelectric/ACS targets and open positions are shown in Table 10 below. MCE procures large hydroelectric from resources across the western interconnection, but with a focus on California and the Pacific Northwest. ACS power is sourced from all three of the existing ACS suppliers: Bonneville Power Administration, Powerex and Tacoma Power.

Table 10: MCE Large Hydroelectric/ACS Balance, 2020-2029 (GWh)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Light Green Retail Sales (GWh)	4,865	4,848	4,813	4,814	4,827	4,856	4,906	4,988	5,119	5,398
Renewables + Large Hydro/ACS Target (%)	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%
Large Hydro/ACS Target (%)	34%	37%	40%	40%	40%	35%	30%	25%	20%	15%
Large Hydro/ACS Target (GWh)	1,654	1,794	1,925	1,926	1,931	1,700	1,472	1,247	1,024	810
Incremental Large Hydro/ACS Required to Cover Distribution Losses (GWh)	0	0	0	116	116	102	88	75	61	49
Large Hydro/ACS Under Contract (GWh)	1,184	625	625	225	225	-	-	-	-	-
Large Hydro/ACS Open Position (GWh)	470	1,169	1,300	1,816	1,822	1,802	1,560	1,322	1,085	858

Fixed Price Forward Contracts

MCE uses fixed price forward contracts (i.e., “fixed for floating” contracts) to hedge CAISO day-ahead market price exposure associated with its portfolio. More specifically, for the volumes and hours where MCE does not have supply contracts that yield CAISO day-ahead revenue, MCE uses fixed price forward contracts where MCE pays a fixed price per MWh in order to receive a floating price that clears for each hour. This helps hedge MCE’s CAISO day-ahead market price exposure because the floating price (NP15) is correlated with MCE’s CAISO load price (PG&E’s default load aggregation point). These contracts are an important complement to MCE’s portfolio, which includes contracts where MCE is not entitled to the CAISO revenue.¹⁸ As MCE procures increasing portions of fixed price renewables with storage and/or fixed price large hydroelectric/ACS, MCE will ramp down on its use of fixed for floating contracts.

Resource Adequacy

MCE meets California’s Resource Adequacy (RA) program requirements by procuring qualifying RA through PPAs and RA-only contracts. As explained in Chapter 3 above, MCE must secure three types of RA: (1) System RA; (2) Local RA; and (3) Flexible RA. Importantly, MCE’s Local RA supply counts toward MCE’s System RA requirement, and MCE’s Flexible RA requirement is fulfilled with Local or System resources. In other words, MCE’s total System RA requirement represents the total capacity that MCE must buy under the RA program, as shown in Tables 11 and 12 below.

Table 11: MCE System and Local Net RA Requirements, 2020-2029

Average Net Requirement Across All Months	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Local RA Requirement (MW)	452	439	421	412	405	400	399	403	414	462
Local RA Requirement (MW)	471	458	440	430	422	417	417	422	434	485
Total System RA Requirement (MW)	923	897	861	842	827	817	816	825	848	947

Table 12: MCE Flexible RA Requirements, 2020

2020 Flexible RA Requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flexible RA Requirement (MW)	466	470	402	330	354	330	251	297	309	338	431	401

Energy Storage

MCE intends to explore additional opportunities to own and contract for energy storage projects. These may include projects located in MCE’s service area or those strategically located elsewhere in California and projects that are co-located with renewable energy generation or those that are developed independently.

¹⁸ For example, MCE uses “index plus” contracts where the supplier schedules power into the CAISO (which contractually constitutes a bundled power delivery to MCE), but the supplier keeps the CAISO revenue, and MCE pays the supplier for the power content attribute.

V. Procurement

MCE will fill its future open positions via a combination of contracted energy resources and demand-side programs. This section describes the types of resources MCE may procure and discusses various considerations that may influence MCE's procurement efforts.

MCE has successfully administered a transition away from its initial full requirements supply contract, under which all conventional energy products, reserve capacity, and renewable energy were provided through a single agreement with a single counterparty. Such a structure was instrumental in minimizing administrative and operational complexities at the time of MCE's launch in May 2010. Since that time, MCE has gained experience in the areas of resource planning and procurement, adding staff to support these critical functions. MCE has also developed robust procurement processes to address the majority of its energy, capacity, and renewable energy requirements through relationships with numerous suppliers.

MCE Generation Development

MCE is targeting new renewable resources within its service area. Toward this goal, MCE may consider direct project investment or ownership of generation assets but has historically utilized long-term PPAs to secure renewable energy supplies at stable costs for its customers. MCE considers asset ownership to offer similar benefits to contracting via long-term PPAs and, therefore, does not have an explicit bias toward either PPAs or asset ownership. MCE examines opportunities for asset ownership – as it does for its contracted resources – on a case-by-case basis, considering such factors as risk allocation, asset location, technology, and, most critically, impact on MCE's customers' rates.

Current federal tax policy generally favors private sector ownership of renewable assets due to the tax credits that are uniquely available to for profit entities. For this reason, MCE's experience has been that PPAs with privately owned renewable generation facilities are typically more cost-effective than development or ownership of resources by MCE. MCE has secured optional buyout provisions in some of its renewable PPAs, which provide a potential path to MCE asset ownership after the tax benefits have been exhausted by the private developer.

Assessing a generation project's operational risk becomes more important for assets owned by MCE because MCE could be at risk for production shortfalls and for cost overruns, which are risks typically absorbed by the developer under a PPA structure. Direct generation investment may become an increasingly viable option during the Planning Period as MCE expects to gain additional operational experience and more robust access to credit markets. As part of this approach, MCE may also consider joint ventures and turnkey development approaches to ensure appropriate allocation of project risks.

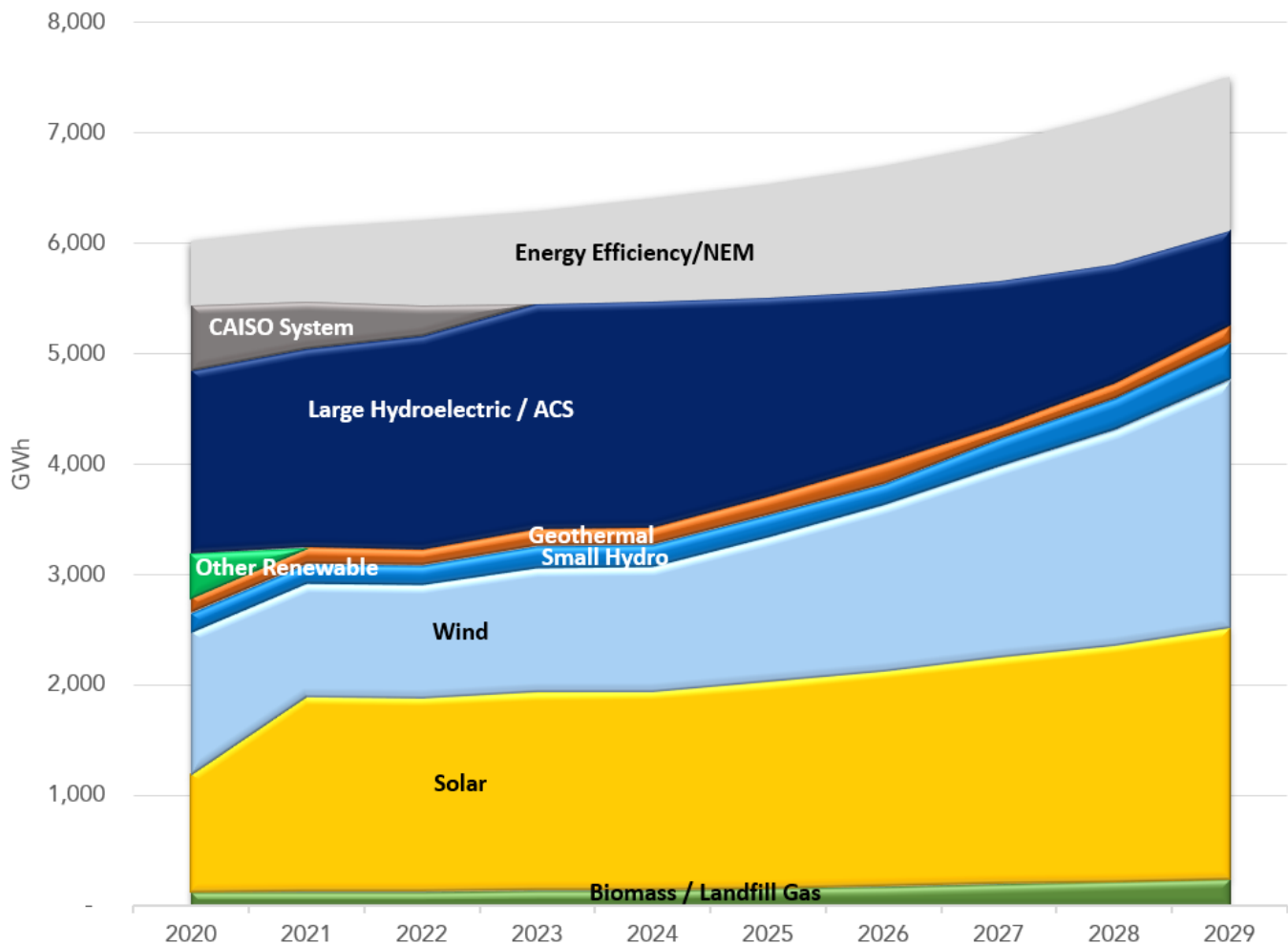
Renewable Energy Purchases

MCE uses a portfolio risk management approach in its power purchasing program, seeking low cost supply as well as diversity among technologies, production profiles, project sizes and locations, counterparties, length of contract, and timing of market purchases. All these factors are taken into consideration when MCE engages the market.

MCE continually manages its forward load obligations and supply commitments with the objective of balancing cost stability and cost minimization, while leaving some flexibility to take advantage of market opportunities or technological improvements that may arise. MCE closely monitors its open positions for PCC 1 and PCC 2 renewable energy, both of which are based on calendar year targets. MCE maintains portfolio coverage targets of up to 100% in the near-term (0 to 5 years) and leaves a greater portion open in the medium to long-term, consistent with generally accepted industry practice.

MCE has no explicit preference for specific renewable energy technologies. MCE’s supply preference is for a mix of renewable energy technologies that will deliver energy in a profile that is generally consistent with its load shape. In regard to generation project location, MCE places the greatest value on locally sited renewable energy projects, particularly those located within its service area or within approximately 100 miles. Of next highest preference are projects sited in the North Path 15 region (generally, Northern California), followed by projects elsewhere in California, and then, finally, out-of-state resources. The projected resource mix during the Planning Period is illustrated below in Figure 9.

Figure 9: Projected MCE Resource Mix (GWh), 2020-2029¹⁹



Feed-In Tariff (FIT)

MCE’s FIT offers a total program capacity of 45 MW on a first-come, first-served basis to renewable resources located in MCE’s service area. The FIT offering allows private developers to finance local renewable energy projects, while catalyzing local job creation associated with the construction, operation, and maintenance of these local projects. By providing attractive, above-market rates, this program incentivizes renewable development in MCE communities where it otherwise would not be built.

¹⁹ Figure 9 above displays the projected resource mix needed to meet MCE’s projected loss-adjusted load. Projected energy efficiency and distributed generation (i.e., NEM) are added back to the loss-adjusted load for reference only. Actual resource utilization to meet loss-adjusted load will depend upon market conditions and resource availability.

MCE's initial FIT program, which offered 15 MW of capacity to projects sized up to 1 MW, is fully subscribed as shown in Table 13 below. Starting in 2018, MCE began the second phase of its FIT program, adding an additional 10 MW of capacity and an updated Tariff for projects in MCE's service area up to 1 MW. Another 20 MW of capacity is available for new FIT Plus projects sized above 1 MW to up to 5 MW, with a new applicable Tariff. All FIT related documents are available on MCE's FIT website.²⁰

Table 13: MCE Feed-In Tariff Projects Associated with Initial 15 MW Program

Project Name	Capacity (MW)	Annual Output (MWh)	Commercial Operation Date
San Rafael Airport	0.972	1,440	Oct-12
Cost Plus Plaza Larkspur	0.261	520	Sep-16
Freethy Industrial Park Unit #1	0.998	1,800	Oct-16
Freethy Industrial Park Unit #2	0.998	1,800	Oct-16
Cooley Quarry 1	0.990	2,900	Jul-17
Oakley RV & Boat Storage	0.990	1,750	Jul-18
EO Products	0.056	112	Dec-18
CMSA	0.750	1,314	Apr-19
DRES Quarry 2.4	0.100	285	May-19
American Canyon A	0.999	2,759	Aug-19
American Canyon B	0.999	2,759	Aug-19
American Canyon C	0.999	2,759	Aug-19
Soscol Ferry Solar C (FIT)	0.990	2,600	TBD
Soscol Ferry Solar D (FIT)	0.990	2,600	TBD
Silveira Ranch A	0.999	2,563	TBD
Silveira Ranch B	0.999	2,563	TBD
Silveira Ranch C	0.999	2,563	TBD
San Rafael Airport 2	0.972	2,005	TBD
TOTAL	15.061	35,092	

Large Hydroelectric and ACS

MCE anticipates that its large hydroelectricity and ACS supplies will be met primarily through short-term and medium-term purchases of California and Pacific Northwest hydroelectricity and ACS, but MCE is also exploring longer-term opportunities. MCE is currently working to become more flexible in its hydroelectricity transactions and will begin taking delivery of hydroelectricity outside the CAISO in 2020, meaning that MCE will begin taking responsibility for importing into California and CAISO intertie scheduling.

System Power and Fixed Price Forward Contracts

Through 2022, MCE plans to rely on CAISO system power for a small portion of its Light Green portfolio and/or associated distribution losses. In 2023 and beyond, MCE does not plan to specifically procure CAISO system power or natural gas-fueled generation, but could have a need to do so if market or regulatory conditions change significantly.

²⁰ <https://www.mcecleanenergy.org/feed-in-tariff/>.

Separately, MCE does have plans to continue engaging in fixed price forward contracts, and MCE's counterparties may schedule physical power into the CAISO to hedge their own risk associated with these contracts. Such physical power, if scheduled, is not for MCE's portfolio.

Total Load Obligations

With respect to MCE's total load obligations, MCE manages exposure to market price risk by executing forward electric supply commitments for its projected energy sales obligations. MCE considers a variety of factors including cost control and competitiveness. Entering into fixed price forward contracts enables MCE to meet budget and rate-setting objectives by increasing cost certainty. However, it is appropriate to maintain modest flexibility for incorporation of new supply- or demand-side resources and limited exposure to CAISO market prices to ensure optimal resource portfolio diversification. In light of these considerations, the following contracting guidelines for fixed-price energy contracts will be used during the Planning Period.

Table 14: MCE Fixed Price Energy Contracting Guidelines

Time Horizon	Fixed-Price Energy Contracting Guidelines
Current Year	70% to 100%
Year 2	60% to 95%
Year 3 and Beyond	Up to 70%

The contracting guidelines above serve to inform MCE's hedging targets used to mitigate price and supply risk. Execution of master power purchase and sale agreements with multiple, credit-worthy counterparties has enabled and will continue to enable energy purchases through transaction-specific confirmations whenever appropriate, consistent with the policies set forth in this plan.

Resource Adequacy Transactions

MCE may engage in purchases or sales of RA capacity from generation resources that qualify to meet RA requirements in accordance with CPUC and CAISO regulations. Terms may range from one month to ten years or more. RA is also often bundled with energy and renewable attributes under MCE's renewable energy PPAs.

VI. Procurement Methods and Authorities

In order to effectively plan and manage its portfolio, MCE differentiates contracts by their term length as follows:

- Short-term: up to twelve months;
- Medium-term: longer than twelve months, up to five years;
- Intermediate-term: longer than five years, up to ten years; and
- Long-term: longer than ten years.

Based upon the expected contract tenor, MCE may use a variety of methods – including competitive solicitations, standard contract offerings, and bilaterally negotiated agreements – throughout the Planning Period.

Procurement Methods

For long-, intermediate-, and medium-term purchase commitments, MCE typically uses competitive solicitations, such as its Open Season solicitation, or standard offer contracts, like its FIT. Through a competitive solicitation, MCE issues a request for offers and concurrently evaluates multiple proposals in the context of market conditions before entering negotiations with those respondents that provide the most compelling offers. Occasionally, MCE will issue ad hoc competitive solicitations or engage in independent bilateral negotiations to meet specific resource needs for which inclusion in an annual solicitation is not appropriate.

With regard to short-term power purchases, MCE may negotiate bilateral agreements directly, especially for unique or time-sensitive transactions that do not lend themselves to inclusion in a competitive solicitation. Alternatively, particularly in markets with sufficient transparency to ensure competitive outcomes, MCE may negotiate short-term transactions via its scheduling coordinator or independent energy brokers or marketers.

MCE procures energy and Resource Adequacy consistent with its Board approved Energy Risk Management Policy.

Procurement Authorities

MCE's energy procurement throughout the Planning Period will be consistent with the delegation of authorities of the Board, including Resolution 2018-03, and/or any other delegation of authorities or relevant Resolution of the Board.

Appendix A: Load and Resource Table

MCE Resource Balance										
August 2019										
	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>
I. Energy Requirements (GWh)										
Baseline Retail Load	5,613	5,676	5,705	5,733	5,762	5,791	5,820	5,849	5,878	5,907
Energy Efficiency	(16)	(22)	(29)	(36)	(42)	(48)	(55)	(61)	(62)	(62)
Distributed Generation	(565)	(637)	(733)	(806)	(887)	(975)	(1,073)	(1,180)	(1,298)	(1,337)
Electric Vehicle Load	95	147	192	252	329	431	563	737	963	1,260
Retail Load (Net of EE/DG/EV)	5,127	5,164	5,135	5,143	5,162	5,198	5,255	5,344	5,482	5,768
Distribution Line Losses and Unaccounted For Energy	308	310	308	309	310	312	315	321	329	346
Total Energy Requirements	5,434	5,474	5,443	5,451	5,472	5,510	5,570	5,664	5,811	6,115
II. Volume Targets										
Light Green Renewable Energy Volume Targets (GWh)										
Portfolio Content Category 1	2,335	2,618	2,888	3,062	3,070	3,346	3,640	3,965	4,341	4,864
Portfolio Content Category 2	584	291	-	-	-	-	-	-	-	-
Portfolio Content Category 3 (REC Only)	-	-	-	-	-	-	-	-	-	-
Subtotal, Light Green Renewable Energy Volume Targets	2,919	2,909	2,888	3,062	3,070	3,346	3,640	3,965	4,341	4,864
Deep Green Incremental Renewable Energy Volume Targets (GWh)										
Portfolio Content Category 1	278	335	342	348	355	363	370	377	385	392
Large Hydro/ACS Energy Volume Targets (GWh)										
	1,654	1,794	1,925	2,041	2,047	1,802	1,560	1,322	1,085	858
III. Contracted Resources										
Renewable Resources Under Contract (GWh)										
Portfolio Content Category 1	2,256	2,198	2,191	2,184	2,153	2,121	2,069	1,974	1,968	1,960
Portfolio Content Category 2	-	-	-	-	-	-	-	-	-	-
Portfolio Content Category 3 (REC Only)	-	-	-	-	-	-	-	-	-	-
Subtotal, Renewable Resources Under Contract	2,256	2,198	2,191	2,184	2,153	2,121	2,069	1,974	1,968	1,960
Large Hydro/ACS Resources Under Contract (GWh)										
	1,184	625	625	225	225	-	-	-	-	-
Fixed Price Forward Contracts (GWh)										
	2,708	1,532	1,068	-	-	-	-	-	-	-
Total Contracted Energy (GWh)										
	6,148	4,355	3,884	2,409	2,378	2,121	2,069	1,974	1,968	1,960
Less Variable Price Contracted Energy (GWh)	1,527	670	670	270	270	46	-	-	-	-
Total Fixed Price Contracted Energy (GWh)	4,621	3,685	3,214	2,139	2,108	2,075	2,069	1,974	1,968	1,960
IV. Open Positions										
Renewables Open Position (GWh)										
Portfolio Content Category 1	356	755	1,038	1,226	1,273	1,587	1,942	2,368	2,758	3,296
Portfolio Content Category 2	584	291	-	-	-	-	-	-	-	-
Portfolio Content Category 3	-	-	-	-	-	-	-	-	-	-
Total Renewables Open Position (GWh)	940	1,046	1,038	1,226	1,273	1,587	1,942	2,368	2,758	3,296
Large Hydro/ACS Open Position (GWh)										
	470	1,169	1,300	1,816	1,822	1,802	1,560	1,322	1,085	858
Total Hedging Needs - Open Position (GWh)										
	813	1,789	2,229	3,312	3,364	3,434	3,502	3,690	3,843	4,155
Total Hedging Coverage										
	85%	67%	59%	39%	39%	38%	37%	35%	34%	32%