MARIN COUNTY | NAPA COUNTY | UNINCORPORATED CONTRA COSTA COUNTY
BENICIA | CONCORD | DANVILLE | EL CERRITO | LAFAYETTE | MARTINEZ | MORAGA
OAKLEY | PINOLE | PITTSBURG | RICHMOND | SAN PABLO | SAN RAMON | WALNUT CREEK

Technical Committee Meeting
Thursday, November 1, 2018
8:30 A.M.

Charles F. McGlashan Board Room, 1125 Tamalpais Avenue, San Rafael, CA 94901
Mt. Diablo Room, 2300 Clayton Road, Suite 1150, Concord, CA 94520
City of El Cerrito, 10890 San Pablo Avenue, Hillside Conference Room, El Cerrito, CA 94530
City of San Ramon, 7000 Bollinger Canyon Road, Room 256, San Ramon, CA 94583

1. Roll Call/Quorum
2. Board Announcements (Discussion)
3. Public Open Time (Discussion)
4. Report from Chief Executive Officer (Discussion)
5. Consent Calendar (Discussion/Action)
   C.1 10.8.18 Meeting Minutes
6. Integrated Resource Plan (Discussion/Action)
7. Electric Vehicle and EVSE Program Update (Discussion)
8. Committee Member & Staff Matters (Discussion)
9. Adjourn

Agenda material can be inspected at 1125 Tamalpais Avenue, San Rafael, CA 94901 on the Mission Avenue side of the building and at One Concord Center, 2300 Clayton Road, Concord, CA 94520 at the Clayton Road entrance. The meeting facilities are in accessible locations. If you are a person with a disability and require this document in an alternate format (example: Braille, Large Print, Audiotape, CD-ROM), you may request it by using the contact information below. If you require accommodation (example: ASL Interpreter, reader, note taker) to participate in any MCE program, service or activity, you may request an accommodation by calling (415) 464-6032 (voice) or 711 for the California Relay Service or by e-mail at djackson@mceCleanEnergy.org not less than **four work days** in advance of the event.

DRAFT

MCE
TECHNICAL COMMITTEE MEETING
October 8, 2018
12:00 P.M.

Charles F. McGlashan Board Room, 1125 Tamalpais Avenue, San Rafael, CA 94901
Mt. Diablo Room, 2300 Clayton Road, Suite 1150, Concord, CA 94520
City of El Cerrito, Hillside Conference Room, 10890 San Pablo Avenue, CA 94530
City of San Ramon, 7000 Bollinger Canyon Rd., Room 256, San Ramon, CA 94583

Roll Call

Present: Kevin Haroff, City of Larkspur (**San Rafael**)
Greg Lyman, City of El Cerrito (**El Cerrito**)
Scott Perkins, City of San Ramon (**San Ramon**)
Kate Sears, County of Marin (**San Rafael**)
Don Tatzin, City of Lafayette (**Concord**)
Ray Withy, City of Sausalito (**San Rafael**)

Absent: Rob Schroder, City of Martinez

Staff: Greg Brehm, Director of Power Resources (**Concord**)
Jesica Brooks, Board Assistant (**San Rafael**)
Kirby Dusel, Resource Planning & Renewable Energy (**San Rafael**)
Darlene Jackson, Board Clerk (**Concord**)
Sam Kang, Resource Planning (**San Rafael**)
Vicken Kasarjian, Chief Operating Officer **(San Rafael)**
Lindsay Saxby, Interim Deputy Director of Power Supply Contracts (**San Rafael**)
Dona Stein, Principal Consultant **(San Rafael)**
Dawn Weisz, Chief Executive Officer (**San Rafael**)

Quorum was established and the meeting was called to order at 12:01 P.M. by Committee Chair, Kate Sears.

Action Taken:

Agenda Item #3 – Public Open Time

Committee Chair, Sears asked for public comment and there was none.

Agenda Item #4 – Report from the Chief Executive Officer (Discussion)

CEO Dawn Weisz presented a brief report and addressed questions from the Committee:

- Introduced CB Hall, Power Supply Contracts Manager and Dona Stein, Pacific Energy Advisor, Inc. Principal Consultant.
- Power Content Label was mailed out. Look out for it in your mailboxes.
- Thanked the Committee members that were able to attend the Board Retreat.
- The PCIA decision has been pushed back to October 11, 2018.

Committee Chair Sears asked for public comment and there was none.

DRAFT

Agenda Item #05 – C.1: 8.30.18 Meeting Minutes (Discussion/Action)

Committee Chair Sears asked for public comment and there was none.

ACTION: It was M/S/C (Lyman/Haroff) to **approve 8.30.18 meeting minutes**. Motion carried by unanimous vote. (Absent: Director Schroder).

Agenda Item #05 – C.2: Contract with PEA (Discussion/Action)

Dawn Weisz, Chief Executive Officer, presented this item and addressed questions from the Committee.

Committee Chair Sears asked for public comment and there was none.

ACTION: It was M/S/C (Lyman/Haroff) to **approve the Second Agreement with Pacific Energy Advisors, Inc.** Motion carried by unanimous vote. (Absent: Director Schroder).

Agenda Item #06 – MCE 2019 Integrated Resource Plan (Discussion/Action)

Lindsay Saxby, Power Supply Contracts Manager, presented this item and addressed questions from the Committee.

Committee Chair Sears asked for public comment and there were comments from member of the public Henry Nakkyo.

ACTION: It was M/S/C (Haroff/Lyman) to **direct staff to set the greenhouse gas-free target in the 2019 Integrated Resource Plan to 100% by 2022 and set the renewable energy target at 60% between 2019 – 2022 then increase to 70% by 2023**. Motion carried by unanimous roll call vote. (Absent: Director Schroder).
ACTION: It was M/S/C (Lyman/Haroff) to **adjust MCE's clean planning methodology from loss adjusted figures to actual renewable energy purchases as a percentage of retail sales**. Motion carried by unanimous vote. (Absent: Director Schroder).

The meeting was adjourned at 1:38 P.M. to the next scheduled meeting on November 1, 2018.

Kate Sears, Committee Chair

ATTEST:

Dawn Weisz, Chief Executive Officer

November 1, 2018

TO: MCE Technical Committee

FROM: Lindsay Saxby, Power Supply Contracts Manager

RE: MCE 2019 Integrated Resource Plan (Agenda Item #06)

ATTACHMENT: MCE 2019 Integrated Resource Plan

Dear Technical Committee Members:

BACKGROUND:

MCE's Integrated Resource Plan ("IRP") is intended to articulate the energy procurement targets adopted by MCE's Board of Directors ("Board") and serves as a guideline to MCE staff regarding day-to-day operations and long-term portfolio planning and procurement activities. Your Board first approved MCE's ten-year resource plan in Chapter 6 ("Load Forecast and Resource Plan") of the Community Choice Aggregation Implementation Plan and Statement of Intent ("Implementation Plan"), dated January 2010. Regular updates to MCE's resource plans have been approved by your Board via subsequent revisions of the Implementation Plan and, since November 2012, annual IRP updates. In May 2016, your Board delegated authority to approve IRP updates to the Technical Committee via approval of the "Technical Committee Overview."

The IRP has four primary purposes:

1. Quantify resource needs over the ten-year Planning Period, which, in the current IRP update, includes calendar years 2019 through 2028;
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 policies, objectives and planning framework to the public, energy marketers, and key stakeholder groups.

MCE's key resource planning policies, as set forth in the IRP, are as follows:

1. Reduce greenhouse gas ("GHG") emissions and other pollutants associated with the electric power sector through increased use of GHG-free, renewable, and low-GHG energy resources.
2. Maintain competitive electric rates and increase control over energy costs through management of a diversified resource portfolio.
3. Benefit the local economy through investments in infrastructure and energy programs within MCE's service territory.

4. Help customers reduce energy consumption and electric bills through investment in and administration of enhanced customer energy efficiency, cost-effective distributed generation, and other demand-side programs.
5. Enhance system reliability through investment in supply- and demand-side resources.
6. Actively monitor and manage operating and market risks to promote MCE's continued financial strength and stability.

The IRP translates these broad policy objectives into more specific planning elements focused on the use of various resource types, taking into consideration MCE's projected customer needs and MCE's existing resource commitments. The IRP identifies:

1. Projected customer demand and energy needs, specifically those for renewable, GHG-free, and conventional energy, over the Planning Period;
2. Estimated deliveries from contracted resources that will fill portions of these energy needs;
3. Subsequent "open positions" that result from the difference between future energy needs and commitments from currently contracted resources; these open positions dictate the timing and magnitude of additional energy procurement that may be required to meet specified resource goals; and
4. To the extent that open positions exist, the IRP describes the procurement methods and guidelines that MCE will utilize to meet them.

MCE's IRP is updated annually, typically in the fall – after summer's procurement activities have concluded and in anticipation of the next year's procurement planning. This 2019 IRP update includes the impacts of MCE's Board-approved Contra Costa County inclusion that occurred in April, 2019 It also includes the October 8, 2018 Technical Committee approval to advance MCE's carbon-free target year from 2025 to 2022 while maintaining MCE's renewable portfolio at 60% during that same four-year period.

SUMMARY OF CHANGES:

The 2019 IRP is provided as an attachment to this report. It affirms and advances progress toward MCE's goals by increasing MCE's GHG-free targets throughout the Planning Period, setting the 2019 GHG-free portfolio content to 90% and working toward a 100% GHG-free goal in the next four years. The 2019 draft IRP includes:

- Updated Energy Contracting targets that incorporate consistent annual procurement objectives throughout the Planning Period in order to mitigate the impacts of previous MCE growth and moderate long-term contract commitments;
- MCE's preference for GHG-free and renewable resources when contracting via fixed-price contracts to "hedge" open physical positions and reduce California Independent System Operator ("CAISO") market exposure;
- Incorporation of forecasted increases in customer demand due to growth in Electric Vehicles ("EV");
- Incorporation of load-modifying customer behaviors such as increasing Net Energy Metering ("NEM") and energy storage adoption within MCE's service area;

- Consideration of MCE's direct procurement of energy storage through its first energy storage Request for Offer, in addition to previously contemplated customer-focused energy storage strategy;
- Discussion of Asset Controlling Supplier ("ACS") resources, which MCE intends to categorize within its "GHG-free" portfolio; the extremely low emissions factors associated with ACS supply shall be incorporated into MCE's overall emissions factor;
- A "Note to the Reader" on the differences between MCE's IRP and the California Public Utilities Commission ("CPUC") IRP process.

The IRP summarizes the following progress toward MCE's energy and capacity obligations:

- MCE has contracted for its projected Renewable Portfolio Standard ("RPS") compliance needs through 2025; open renewable positions remain from 2019 through the Planning Period for MCE's voluntary renewable energy targets;
- MCE has addressed its conventional energy requirements in line with its planning guidelines via contractual commitments that are in place through 2020;
- Implementation of Assembly Bill 1110 may eliminate the GHG-free treatment of unbundled renewable energy certificates. This 2019 IRP therefore does not include unbundled renewable energy certificates in MCE's portfolio after 2018.
- MCE has addressed its required reserve capacity ("Resource Adequacy" or "RA") and flexible capacity obligations per its contracting guidelines via commitments extending through 2019;
- MCE continues to focus on energy purchases from new, California-based renewable energy resources throughout the Planning Period. Potential competition for these limited resources may necessitate MCE to consider renewable energy imports from the Pacific Northwest and other areas throughout the Western Electricity Coordinating Council ("WECC"), which generally encompasses the Western United States.

In addition, the 2019 IRP provides updates on MCE's portfolio of power suppliers and its cultivation of local renewable energy generation, most notably its NEM and Feed-in Tariff ("FIT") programs, as well as the completion of the MCE Solar One facility in Richmond, CA:

- As of October 2018, MCE serves approximately 28,700 NEM customers, up from over 14,000 last year. Following expansion into Contra Costa County earlier this year, these smaller-scale renewable generating projects now represent more than 306,000 kW (306 MW)[1] of local renewable generating capacity, up from 128,000 kW (128 MW) this time last year;
- Through a partnership with Grid Alternatives, MCE has contributed $345,000 to low-income residential solar installations, totaling nearly 249 kW of new rooftop solar since 2012; saving customers an estimated $2 million on monthly utility bills over 20 years and eliminating over 4,000 metric tons of GHG emissions over the 25-year lifespan of the installations;
- In addition to NEM generating capacity, MCE is planning to develop or purchase renewable energy from up to 35 MW of locally developed capacity by 2021. To this end, MCE has invested staff time and financial resources in various

[1] This figure is being refined.

development activities within its service territory. For example, MCE Solar One is a 10.5 MW solar photovoltaic (PV) project in the City of Richmond which commenced commercial operation in December 2017;

- 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 to up to 45 MW of qualifying renewable energy projects within MCE's service territory. 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.

RECOMENDATION: Approve MCE's 2019 Integrated Resource Plan..

2019 Integrated Resource Plan

November 2018

Approved by MCE Technical Committee on [_____]

MCE 2019 Integrated Resource Plan

Contents

A Note to the Reader: MCE and CPUC Integrated Resource Plans

This document, MCE's 2019 Integrated Resource Plan ("IRP"), provides an overview of MCE's resources and resource planning, and summarizes MCE's programs and policies designed to foster a cleaner energy future. Since 2012, MCE has developed this voluntary and publicly available Integrated Resource Plan to provide transparency into its resource planning objectives.

Proceeding R. 16-02-007 at the California Public Utilities Commission ("CPUC" or "Commission") required load serving entities (LSEs), including Community Choice Aggregations (CCAs), to submit Integrated Resources Plans using CPUC-developed templates ("CPUC IRP"). MCE complied with this rulemaking and filed an Integrated Resources Plan to the CPUC in August 2018. While this document and the document submitted to the CPUC as a compliance filing both use the title "Integrated Resource Plan", the tools, models and assumptions used to develop each plan are different.

The IRP submitted to the CPUC uses Commission-approved models and assumptions that do not yet capture the complexity and market realities of managing MCE's portfolio or resource planning. MCE is working closely with the CPUC to identify areas of alignment and possible improvement. MCE continues to support information sharing with its customers, the public, project developers and regulators.

MCE's voluntary procurement targets continue to exceed state Renewable Portfolio Standard mandates and have already achieved the CPUC's 2030 Greenhouse Gas emissions target, assigned to MCE in the CPUC's 2018 Integrated Resource Plan proceeding (R.16-02-007). Additionally, MCE continues to advance innovative programs for Electric Vehicles and Energy Efficiency, among others. We encourage readers to continue referencing MCE's IRP for resource planning and program insights.

I. Introduction

As California's first Community Choice Aggregation ("CCA") program, MCE provides retail electric generation services and complementary energy programs to customers within the municipal boundaries of its member communities (collectively, the "service area"), which include:

- Marin County; Belvedere, Corte Madera, Fairfax, Larkspur, Mill Valley, Novato, Ross, San Anselmo, San Rafael, Sausalito, and Tiburon;
- Unincorporated Napa County, American Canyon, Calistoga, Napa, St. Helena, and Yountville;
- Contra Costa County; Unincorporated Contra Costa County, and the cities of Concord, Danville, El Cerrito, Lafayette, Martinez, Moraga, Oakley, Pinole, Pittsburg, Richmond, San Pablo, San Ramon, and Walnut Creek; and
- Benicia.

Figure 1: MCE Service Area, including expansion anticipated in 2018

MCE provides service to more than eighty-five percent 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 to reduce greenhouse gas ("GHG") emissions and to expand access to competitively priced renewable energy and energy efficiency ("EE") programs for all customers. With these objectives in mind, MCE plans for and secures commitments from a diverse portfolio of generating resources to reliably serve the electric energy requirements of its customers over near-, mid-, and long-term planning horizons. This IRP documents MCE's resource planning policies and objectives over the upcoming ten-year planning period from 2019 through 2028 (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.

Purpose

The IRP has four primary purposes:

(1) quantify resource needs, in conjunction with load expectations, over the Planning Period;
(2) prioritize resource preferences and articulate relevant energy procurement[1] 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 stakeholder groups.

In practical terms, the IRP specifies the energy procurement strategy adopted by MCE's Board and serves as a guideline to MCE staff regarding day-to-day energy planning and procurement activities.

Executive Summary

Highlights of this IRP update include the following:

- MCE will manage a portfolio of power resources to supply a target renewable energy content of 60 percent for its Light Green customers. MCE plans to increase its renewable energy content, subject to product availability and rate-related considerations, to 70 percent for Light Green customers by 2030. MCE has a long-term goal of supplying 100 percent renewable energy to all of its customers.

- MCE continues to provide its customers with voluntary 100 percent renewable energy service options: Deep Green, which is wholly sourced from various renewable energy projects located in California; and Local Sol, which began supplying participating customers with 100 percent locally sourced (i.e., the supplying generating facilities are located entirely within MCE's service area) solar photovoltaic ("PV") energy in July 2017.

[1] Within this IRP, energy procurement refers to the purchase of energy products, including electricity, capacity, bundled renewable energy credits, energy efficiency, distributed generation, demand response, and energy storage.

- MCE's energy supply portfolio now includes approximately 60 energy contracts with more than thirty-three energy product suppliers. Through the Planning Period, MCE anticipates continued diversification of its supply portfolio.

- MCE's existing and planned supply commitments throughout the Planning Period will enable MCE to fulfill applicable regulatory mandates and voluntary procurement targets related to renewable, greenhouse gas-free ("GHG-free" or "carbon-free"), and conventional (non-renewable) energy. In particular, MCE has taken important steps to ensure delivery of a reliable, environmentally responsible power supply portfolio, including:

    - Contracting for all projected, state-mandated Renewable Portfolio Standard ("RPS") compliance requirements through 2025;
    - Addressing open renewable energy positions throughout the Planning Period related to MCE's voluntary renewable energy targets (which significantly exceed state-mandated procurement requirements);
    - Addressing conventional energy requirements per MCE's adopted planning guidelines via shorter term contractual commitments that are in place through 2020;
    - Addressing required reserve capacity ("Resource Adequacy" or "RA") and flexible capacity procurement obligations, consistent with applicable compliance mandates, via short-, mid-, and long-term contracts per its contracting guidelines;
    - Increasing energy purchases from new, California-based renewable energy resources throughout the Planning Period.

- MCE continues to provide direct support for the development of local renewable energy projects through the ongoing administration of its Net Energy Metering ("NEM") and Feed-In Tariff ("FIT") programs. Notable achievements in this area include the following:

    - Following expansion of its service area in 2018, MCE now serves approximately 28,724 NEM customers; the smaller-scale renewable generating projects that have been installed by such customers represent more than 306,000 kW (306 MW)[2] of installed, behind-the-meter local renewable generating capacity;
    - Since 2012, MCE has allocated $345,000 for solar rebates and has provided $111,100 in rebates to help with the installation of 147 solar systems, 126 of which occurred on the homes of low income customers, thanks to MCE's partnership with GRID Alternatives. The $111,100 in rebates provided 381 kW of new solar generation, 249 kW of which was provided to low income customers. GRID Alternatives estimates that the program participants will save over $2 million on their monthly utility bills over 20 years and eliminate over 4,000 metric tons of GHG emissions over the 25-year lifespan of the installations. Starting in 2018, Net Energy Metering 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;

[2] This figure is being refined.

- In addition to rooftop generating capacity, MCE is planning to develop or purchase energy from 35 MW of locally constructed (within MCE's service area), utility-scale renewable generating capacity by 2021. To this end, MCE has invested staff time and financial resources in various development activities within its service area. For example, Solar One is a 10.5 MW solar PV project in the City of Richmond which achieved commercial operation in December 2017;
- 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 a 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.

MCE is working toward a long-term goal of offsetting two percent of its annual energy and capacity requirements with EE and distributed energy resource ("DER") programs. MCE applied to the CPUC, and was approved for an increase of the EE budget for MCE-administered programs while 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 five percent of its annual RA capacity via demand response ("DR") programs by the end of the Planning Period. MCE plans to explore funding opportunities for DR programs as new programs are rolled out in 2019.

➢ During the Planning Period, MCE will procure requisite energy products through various mechanisms, including public solicitations, standard offer contracts, and bilateral engagements as procurement opportunities present themselves outside of the aforementioned processes.

II. General Resource Planning Policies

MCE policy, established by MCE's founding documents and directed on an ongoing basis by MCE's Board, guides 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 through investments in infrastructure, energy, and workforce development programs within MCE's service area.
- Help customers reduce energy consumption and electric bills through investment in and administration of 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 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

Senate Bill 100

Senate Bill ("SB") 100, signed by the Governor in September 2018, directs all LSEs to procure 60% of their portfolios from RPS-eligible resources by 2030, and 100% of all retail sales of electricity need to come from zero-carbon resources (or eligible renewable resources) by 2045. As of the 2019 IRP filing, MCE is fully compliant with the 2030 requirement with more than 60% of its portfolio RPS qualified. MCE expects to achieve a 100% GHG free portfolio by 2022, 23 years earlier than the SB 100 mandate.

Energy Storage

The California Energy Storage Bill, Assembly Bill ("AB") 2514, was signed into law in September of 2010, and, as a result, the CPUC established energy storage targets for investor-owned utilities ("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 percent of their forecasted 2020 peak load. Based upon current load forecasts, the decision requires MCE to install 10 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 methodologies for insuring projects are cost-effective.

Renewable Portfolio Standards (RPS) and Senate Bill (SB) 350

Through 2016, the CPUC has been overseeing implementation of SB 350, which Governor Brown signed in October 2015. Among other GHG-reduction provisions, SB 350 called for California's RPS targets to increase to 50 percent by 2030 (now superceded by the 60% target stated in SB 100). SB 350 also includes certain procedural changes that will impact MCE. With respect to CCAs, SB 350 requires that:

- CCAs must have at least 65 percent of their RPS compliance procurement under contracts of 10 years or longer beginning in 2021;
- CCA EE programs will be eligible to count toward statewide EE targets; and
- While maintaining independent governing authority, CCAs will submit CPUC IRPs to the Commission for certification.

MCE will comply with the applicable planning and procurement requirements reflected in SB 350. Given its existing and planned commitments to long-term renewable energy procurement and EE program administration, MCE does not anticipate the need for significant modifications to its planning or procurement practices to achieve SB 350 compliance.

Resource Adequacy (RA)

Resource Adequacy is a CPUC administered program that ensures LSEs provide sufficient resources to the California Independent System Operator to ensure the safe and reliable operation of the grid in real time while helping to provide incentives for the siting and construction of new resources needed for reliability in the future. Decision D.18-06-030 adopted local and flexible capacity obligations for 2019 for LSEs and established a policy supporting a multi-year procurement framework for local resource adequacy. D.18-06-030 expressed the CPUC's intent to adopt a multi-year local resource adequacy requirement with a three-to-five-year duration, with implementation beginning in the 2020 resource adequacy program year. The requirements for the multi-year procurement framework, including the potential role for a "central buyer" for certain resource adequacy products, is being considered in Track 2 of the resource adequacy proceeding.

Power Source Disclosure

AB 1110, signed into law in September of 2016, directs the California Energy Commission ("CEC") to adopt a methodology for the calculation of GHG emissions intensity for each electricity product offered by a retail supplier. The CEC has initiated a series of pre-rulemaking activities, such as providing three draft implementation proposals and the opportunity to comment on each proposal, to engage stakeholders. MCE has been an active participant in this proceeding and will continue to engage in dialogue with CEC staff to ensure that adopted regulations: 1) reflect industry best practices for GHG emissions accounting and reporting; 2) provide greater clarity to customers regarding the GHG intensity associated with MCE electricity products; and 3) promote alignment, where possible and appropriate, between AB 1110 and other state renewable energy programs.

MCE Procurement Targets

GHG-Free by 2022

MCE's mission includes reduction of GHG emissions. With this in mind, MCE will commence the Planning Period with a targeted 90% GHG-free supply portfolio in 2019[3]. The GHG-free proportion of MCE's resource mix will be comprised of both RPS-eligible renewable energy and additional GHG-free electricity.[4] MCE will steadily increase its use of GHG-free energy supply with the goal of achieving a 100 percent GHG-free supply portfolio by 2022, subject to operational practicalities and product availability.

Note that not all renewable energy is GHG-free, as certain generating technologies, particularly those using geothermal and biofuel sources, are known to produce carbon dioxide and other GHGs during electric power generation.[5] That noted, the majority of RPS-eligible renewable generating technologies are understood to be carbon-neutral, meaning that the net environmental impacts associated with the processes required to produce electric power are no worse than the environmental impacts associated with activities that would otherwise occur.[6] Moreover, MCE ensures that any power purchase agreements transfer to MCE all environmental attributes associated with renewable electricity.

MCE understands that implementation of AB 1110 will further clarify emissions intensity reporting for all generating technologies. MCE will apply pertinent emissions calculation methodologies, once finalized, when performing emissions accounting related to its electric supply portfolio.

70 Percent Renewable Energy by 2030

In pursuit of its goal to increase the Light Green product content to 70 percent renewable by 2030, MCE intends to gradually replace the conventional energy resources in its supply portfolio with renewable resources. Actual annual renewable 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, but the primary goal is to achieve a 70 percent Light Green renewable supply no later than 2030.[7] MCE's annual renewable content targets appear in Table 1 below.

Limited Use of Unbundled Renewable Energy Certificates

MCE pursues a diversified renewable energy supply portfolio, which reflects a broad use of various RPS-eligible fuel sources and products, resource locations, project configurations and other considerations.

[3] In order to provide its Light Green customers with 90% GHG-free power, MCE will target 90.9% GHG-free power as a portion of total loss-adjusted load to account for Deep Green sales as well as losses to the distribution system.
[4] For purposes of portfolio planning, MCE includes hydro-electric power and the predominantly hydro-electric energy produced by Asset Controlling Suppliers ("ACS") in its "GHG-free" category. These ACS suppliers' extremely low portfolio emissions factors are factored into MCE's emissions rate and can be found on the California Air Resources Board ("CARB") website at: https://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep-power/acs-power.htm.
[5] 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.
[6] For example, although there are GHG emissions associated with power generated by combustion of methane at capped landfills, such energy is considered to be renewable, and its GHG impacts are less than or – at worst – equal to those of the methane flaring that would occur otherwise.
[7] While MCE increases its Light Green portfolio to 70 percent renewable, Deep Green and Local Sol customers will continue to receive 100 percent renewable energy.

However, MCE has committed to limit the use of unbundled renewable energy certificates (otherwise known as "Portfolio Content Category 3," "PCC 3," or "Bucket 3") to no more than three percent of its total resource mix. This limitation generally aligns with specifications reflected in California's RPS program, which impose restricted use of PCC 3 products approximating three percent of annual retail sales during the third Compliance Period, which includes 2017 through 2020. MCE does not expect to contract for PCC 3 RECs in 2019 and beyond. However, MCE may occasionally purchase PCC3 RECs during the Planning Period as it manages its overall renewable energy content in the face of variable load and renewable energy supplies. To maintain progress toward its 70 percent renewable energy target, MCE will substantially focus on the procurement of bundled[8] renewable energy supply throughout the Planning Period, as reflected in Table 1.

Table 1: MCE 10-Year Retail Portfolio Mix Targets

10-Year Portfolio Mix (%)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
PCC 1 Renewable / Retail Sales	44%	44%	44%	44%	45%	46%	47%	47%	48%	49%
PCC 2 Renewable / Retail Sales	17%	17%	17%	17%	18%	18%	18%	19%	19%	19%
PCC 3 Renewable / Retail Sales	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Large Hydro / Retail Sales	29%	33%	36%	39%	37%	36%	35%	34%	33%	31%
Conventional Energy / Retail Sales	10%	6%	3%	0%	0%	0%	0%	0%	0%	0%
Total Renewable / Retail Sales	**61%**	**61%**	**61%**	**61%**	**63%**	**64%**	**65%**	**66%**	**67%**	**69%**
Total GHG-Free / Retail Sales	**90%**	**94%**	**97%**	**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 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] Portfolio Content Category 1 ("PCC 1" or "Bucket 1") and Portfolio Content Category 2 ("PCC 2" or "Bucket 2"), per California RPS compliance regulations and explained in further detail in the "RPS Requirements" subsection of "IV. Resources."

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 diverse suppliers of its energy providers, in 2018 MCE used the CPUC's 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 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.

III. Electric Load Forecast

MCE's long-term load forecast is primarily influenced by the number of customers that MCE expects to serve, and 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

As of October 2018, MCE serves approximately 471,000 customer accounts in Marin County, Napa County, unincorporated Contra Costa County, the cities of El Cerrito, Lafayette, Richmond, San Pablo, Concord, Danville, Martinez, Moraga, Oakley, Pinole, Pittsburg, San Ramon, and Walnut Creek, and the city of Benicia in Solano County.

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.[9] The difference between current customers and eligible customers represents the subset of customers that have voluntarily determined to opt-out of the MCE program. These customers receive bundled service from Pacific Gas & Electric ("PG&E"), the incumbent IOU 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

[9]This does not include Direct Access customers operating within the new communities being enrolled.

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 amongst 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 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 often includes tabling events, offering presentations to local groups, contacting high electricity users, placing advertisements in local newspapers and on billboards, 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. Following the initial enrollment period, MCE's customer base stabilizes, and the impacts of customers voluntarily returning to MCE service (also known as "opting-in") generally offset the effects of customer attrition.

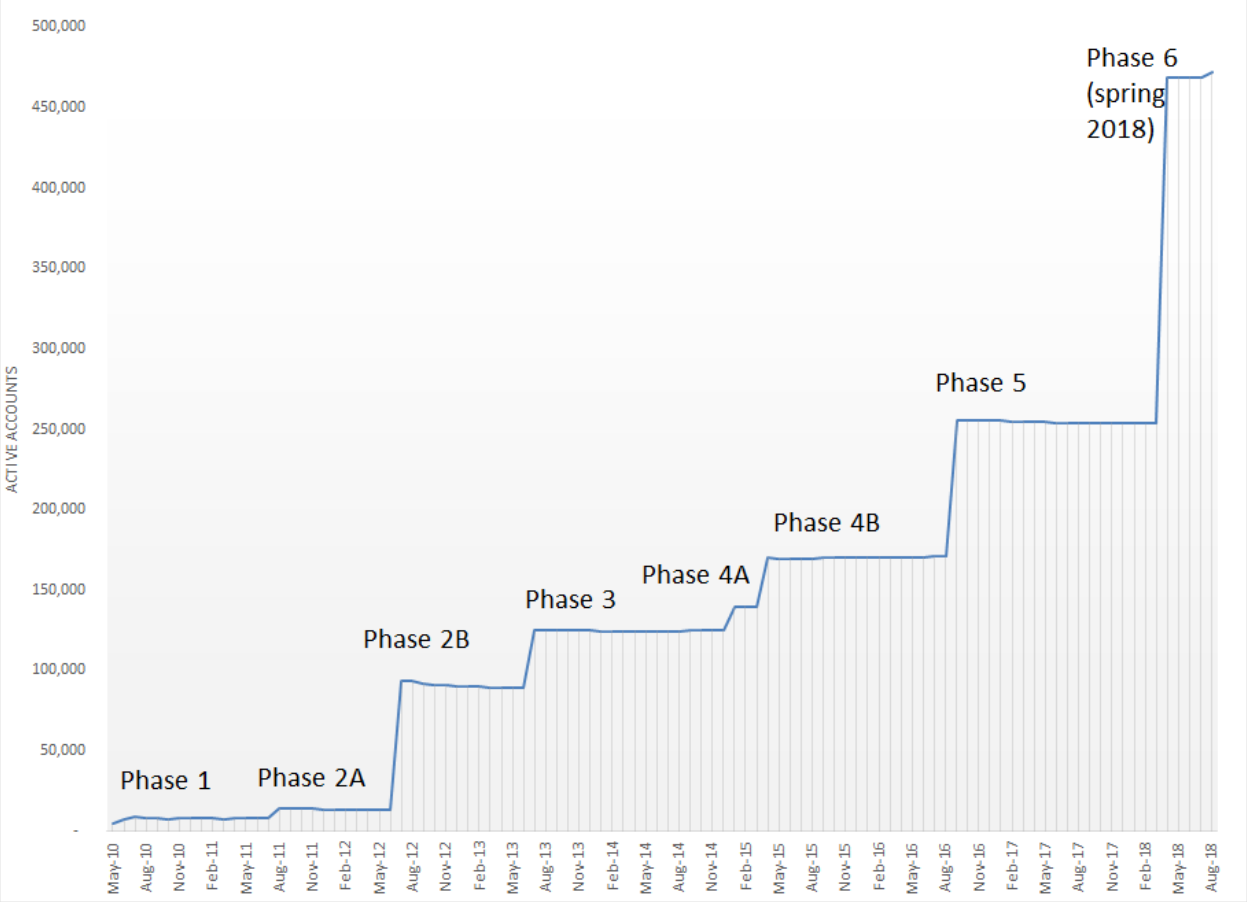
The customer participation rate associated with MCE's initial enrollments of Marin County is approximately 77 percent. Customer participation rates have increased in subsequent MCE enrollment phases: 81 percent of customers who were offered service following inclusion of the City of Richmond have continued with MCE; 86 percent in MCE's subsequent expansion footprint of Benicia, San Pablo, El Cerrito, and unincorporated Napa County; 89 percent 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 IOU marketing tactics against CCAs, and general familiarity with the CCA service model, which continues to expand throughout California. The various phases of MCE's growth are summarized in Table 2.

Table 2: MCE Expansion Phases

MCE Phase	Description	Number of Accounts	Implementation Date
Phase 1	MCE Member (municipal) accounts & a subset of residential, commercial and/or industrial accounts, comprising approximately 20 percent 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 percent of total customer load within	6,100	August 2011

	MCE's original Member Agencies (incremental addition to Phase 1).		
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 2: 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. Certain adjustments are incorporated in the base forecast to account for factors not reflected in the historical data. MCE also makes explicit adjustments to this forecast to account for the load impacts of its DER programs and emerging market factors such as growing electricity demand related to electric vehicle ("EV") charging.

Distributed Energy Resources (DERs)

MCE anticipates that DERs will play an increasingly important role in reducing GHG emissions and optimizing energy procurement and use in its service area. Collectively, EE, Demand Response ("DR"), rooftop solar, energy storage, EVs, and water-energy conservation can provide multiple revenue streams and benefits to MCE and its customers. Specifically, MCE expects to utilize DERs to maximize the use of renewable energy and reduce GHG emissions while achieving community benefits such as reduced local GHG emissions, increased workforce opportunities, and customer bill savings.

MCE considers DER deployment to be an emerging market opportunity, albeit one that presents many challenges to successful implementation. MCE is actively addressing these challenges by developing tools and pilot programs to usher in wider-scale DER deployment not only within its service area but also statewide through adoption by other CCAs forming within California.

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

The CEC awarded MCE a Local Government Challenge Grant of $1.75 million to pursue an innovative Building 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 also to i) 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; and ii) 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 Q3 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 percent 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 percent 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 $12,540 in incentives for these electrification measures (including high performance attics and walls, efficient windows, heat pump water and space heaters, smart thermostats, EV charging, solar plus storage). This process braids multiple funding sources through one application process. There will be an additional 20% incentive provided to income-qualified households.

Electric Vehicles (EVs)

The electrification of transportation will play an essential role in reducing GHG emissions in our communities. Over the past 18 months, MCE has been piloting and engaging in a number of EV-related initiatives to inform larger program offerings in the future. These initiatives have included DR-enabled charging devices, incentives for electric buses, funding for charging stations, and a strategic planning engagement in partnership with the US EPA to analyze local EV market trends and their impact to MCE's customer demand.

MCE has identified workplace EV charging as an opportunity to shift demand of the 7,507 EV drivers in its service area[10] to hours of the day when energy is frequently cheaper, cleaner, and when excess renewable generation might otherwise be curtailed. MCE sees this clean, renewable, and abundant fuel, which is typically priced lower than an equivalent amount of gasoline-based fuel, as a key value proposition. MCE is coordinating with PG&E on their EV Charge Network program and managing a stand-alone 3-year EV charging rebate program (MCEv) to actively facilitate the alignment of available funding sources and technical assistance for commercial customers interested in installing and operating charging stations in MCE's service area. Built into MCEv is also a rebate for income-qualified customers interested in purchasing new or used electric vehicles.

Energy Efficiency (EE)

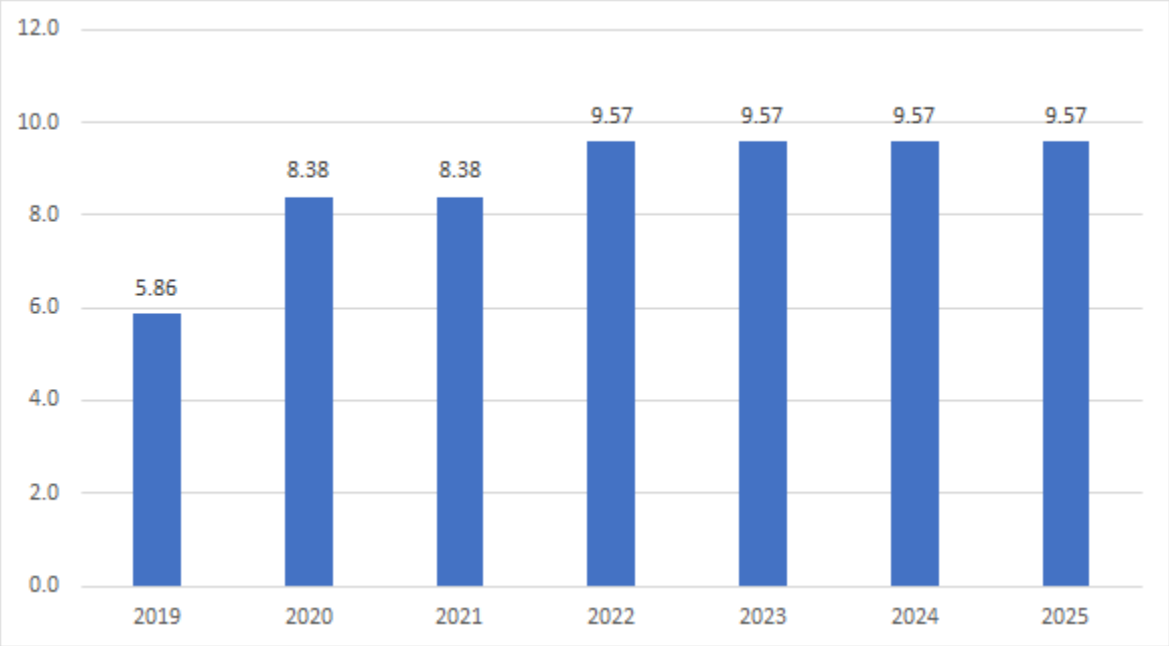
As referenced in the MCE Implementation plan, studies indicate that a reasonable long-term goal for EE programs in MCE's service area is to reduce overall annual energy consumption by approximately two percent. MCE's 2019 peak demand forecast is approximately 1,048 MW, and annual consumption is expected to be approximately 5,275,000 MWh, two percent of which is 105,500 MWh. Achieving this level of savings will require development of specific programs, anticipated funding, and time to deploy the efficiency measures.

MCE has a statutory right to serve as an independent administrator of ratepayer-funded EE programs. Such 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 the multifamily, commercial, and single family sectors and will be rolling out agriculture, industrial, and a suite of comprehensive single family programs. In addition, MCE layers additional incentives for income qualified, multifamily properties with incentives from the Multifamily Energy Savings Program through the Low-Income Families and Tenants ("LIFT") Program, which includes a fuel switching component that incentivizes property owners to replace gas space and water heaters with heat pump technology to further benefit our most economically vulnerable

[10] As of September 2016, California Department of Motor Vehicles.

community members. The LIFT program is funded through the Energy Savings Assistance Program (ESAP), also administered by the CPUC. The first year savings forecasts of MCE-administered EE programs are reflected below in Figure 3.

Figure 3: MCE 1st Year Energy Efficiency Impacts (GWh)



(1) Forecast includes ratepayer funded EE programs approved for funding through 2025.

To complement these other efforts and create green-collar career pathways through the construction of renewable projects, installation of energy efficiency, and connect local workforce to our Pittsburg call center, MCE has supported workforce development partners such as the Conservation Corps North Bay, Marin City Community Development Corporation ("MCCDC"), Rising Sun Energy Center, RichmondBUILD, and Future Build. Through the approval of our 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.

Energy Storage

In 2018, MCE issued its first standalone energy storage RFO as part of its annual Open Season procurement process. The products sought included behind-the-meter peak demand management systems to serve MCE's commercial and industrial customers, aggregated community energy storage systems capable of scheduling into the California Independent System Operator ("CAISO") markets, and grid asset systems to shape load and to provide grid services. Other benefits that MCE seeks from its energy storage offers include additional Resource Adequacy, generation shifting to cover MCE's super peak demand, energy arbitrage savings to MCE, reduced congestion costs, and potentially supplying Ancillary Services and Proxy Demand Response to the CAISO market.

To date, MCE has 1.34 MW of energy storage resources in its service area, including an installation at the College of Marin.

Figure 4: Energy Storage Installation at College of Marin

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), 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 nearly 30,000 customers (approximately 6.3% of all MCE accounts) with aggregate installed renewable generating capacity of approximately 306,000 kW (306 MW). Beyond NEM, MCE incentivizes local rooftop solar development for low income customers through a partnership with California's Single Family Affordable Solar Housing ("SASH") program administrator, GRID Alternatives. MCE contributes $900 per solar installation to low-income customers who qualify for GRID Alternative's service. By leveraging multiple sources of funding, GRID Alternatives installs these systems in disadvantaged communities at little-to-no cost for the customer. From 2012-2018, MCE allocated $345,000 toward this rebate program and has supported the installation of 126 residential solar PV systems on low-income homes, representing 249.71 kW of new, local renewable capacity.

Community Power Coalition

To facilitate direct community feedback in the development, progress, and evolution of these customer programs, staff engages MCE's Community Power Coalition. The Coalition was formed in 2014 to focus on the interests of underrepresented and historically marginalized constituencies through collaborations with our local partners and open dialogue with our communities. As of 2018, this group represents 31 local organizations, which are invited to meet every other month to discuss regulatory and legislative issues, build community awareness of new MCE programs and policies, provide feedback on these programs and other outreach activities, and hear updates on the Community Choice movement.

IV. Resources

Existing Resource Commitments

MCE currently has approximately 60 energy contracts to ensure requisite conventional, renewable, and GHG-free energy supply. MCE's contract portfolio includes a variety of suppliers, term lengths, product types, quantities, generation technologies, and resource locations. MCE's current portfolio of energy resources is summarized in Table 3, below, with additional detail provided in Appendix B.

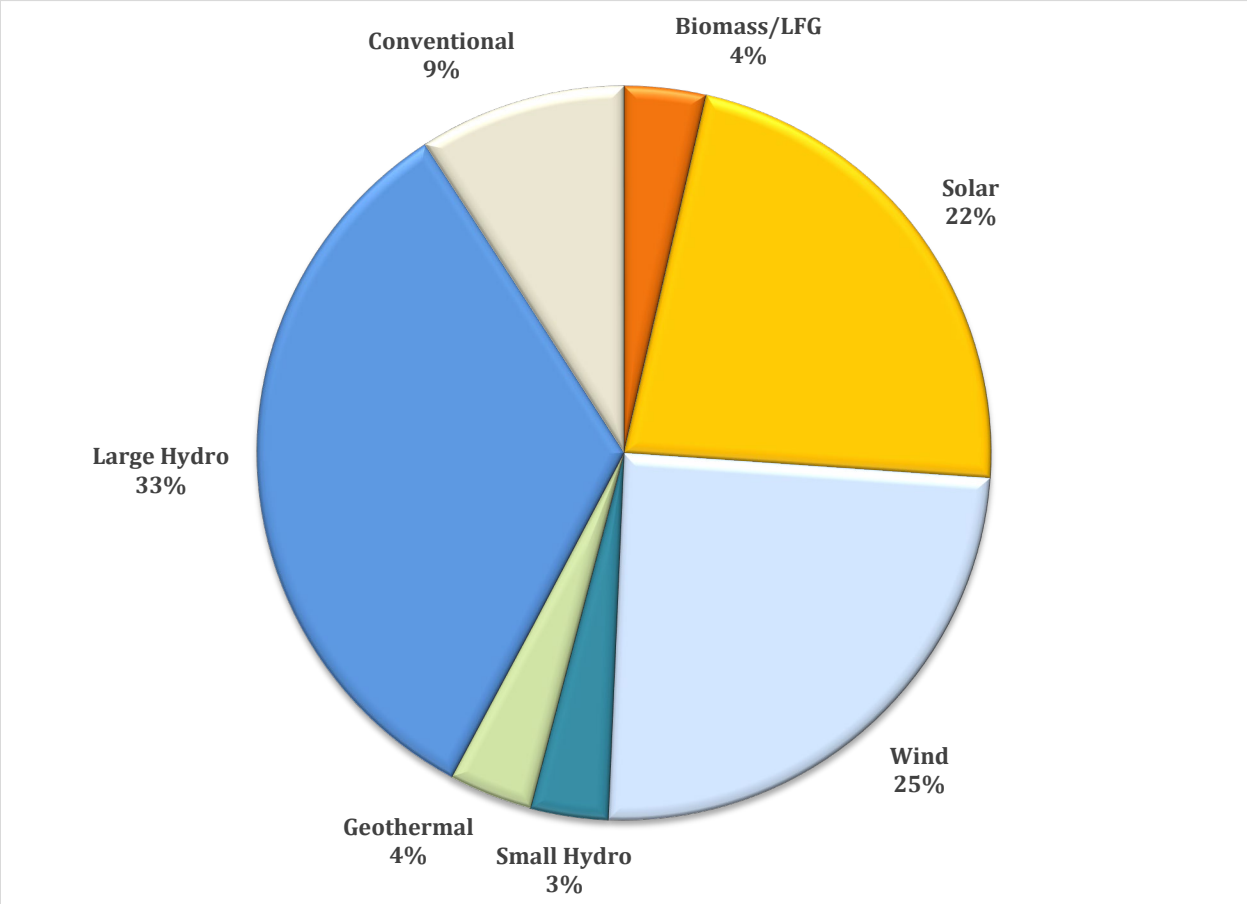
Table 3: MCE Portfolio of Energy Resources as of 6/30/2018

Project	Counterparty	Technology	Contract Capacity (MW)	Term	Annual Deliveries (GWh)	Location
BUNDLED RENEWABLE						
Geysers	Calpine	Geothermal	10	2017-2026	88	Lake Co, Sonoma Co, CA
Energy 2001 - Lincoln Landfill	Genpower	Landfill Gas	4.8	2013-2024	27	Lincoln, CA
G2 Hay Road	G2Energy	Landfill Gas	1.6	2013-2024	12	Solano Co, CA
G2 Ostrom Road	G2Energy	Landfill Gas	1.6	2013-2024	12	Yuba Co, CA
Redwood Landfill	Waste Management	Landfill Gas	4	2017 -2037	30	Novato, CA
Pardee and Camanche Powerhouses	EBMUD	RPS-Eligible Hydro	34	2016-2025	70	Mokelumne River, CA
American Canyon A (FIT)	American Canyon	Solar PV	0.99	2019-2038	2.8	Napa, CA
American Canyon B (FIT)	American Canyon	Solar PV	0.99	2019-2038	2.8	Napa, CA
American Canyon C (FIT)	American Canyon	Solar PV	0.99	2019-2038	2.8	Napa, CA
Antelope Expansion 2	sPower	Solar PV	105	2018 -2037	300	Mojave Desert, CA
CMSA (FIT)	CMSA	Solar PV	0.75	2019 -2028	1.3	San Rafael, CA
Cooley Quarry (MCE Local Sol)(FIT)	Cooley Quarry	Solar PV	0.99	2017 -2036	2.9	Novato, CA
Cost Plus Plaza Larkspur (FIT)	Cost Plus Plaza Larkspur	Solar PV	0.261	2016 -2035	0.5	Larkspur, CA
Cottonwood Solar - City of Corcoran	Dominion	Solar PV	11	2015-2039	30	Kings Co, CA
Cottonwood Solar - Goose Lake	Dominion	Solar PV	12	2015-2039	32	Kern Co, CA
Cottonwood Solar - Marin Carport	Dominion	Solar PV	1	2015-2039	2	Novato, CA
Desert Harvest	EDF	Solar PV	80	2020-2039	237-262	Riverside Co, CA
DRES Quarry (FIT)	DRES Quarry	Solar PV	0.1	2019-2038	0.3	Novato, CA
EO Products (FIT)	EO Products	Solar PV	0.056	2018-2037	0.1	San Rafael, CA
Freethy Industrial Park Unit #1 (FIT)	Freethy Industrial Park Unit #1	Solar PV	0.998	2015-2034	1.8	Richmond, CA
Freethy Industrial Park Unit #2 (FIT)	Freethy Industrial Park Unit #2	Solar PV	0.998	2015-2034	1.8	Richmond, CA
Great Valley	Sempra	Solar PV	100	2018-2032	279-290	Fresno Co, CA
Little Bear 1 Solar	First Solar	Solar PV	40	2020-2039	99-109	Fresno Co, CA
Little Bear 3 Solar	First Solar	Solar PV	20	2020-2039	50-55	Fresno Co, CA
Little Bear 4 Solar	First Solar	Solar PV	50	2020-2039	124-137	Fresno Co, CA
Little Bear 5 Solar	First Solar	Solar PV	50	2020-2039	124-137	Fresno Co, CA
Lost Hills	Con Edison	Solar PV	20	2018-2019	37-50	Kern Co, CA
Oakley (FIT)	Oakley	Solar PV	0.99	2018-2037	1.8	Oakley, CA
Palm Drive A (FIT)	Palm Drive	Solar PV	0.99	2019-2038	2.8	Napa, CA
Palm Drive B (FIT)	Palm Drive	Solar PV	0.99	2019-2038	2.8	Napa, CA
Palm Drive C (FIT)	Palm Drive	Solar PV	0.99	2019-2038	2.8	Napa, CA
RE Mustang	Recurrent	Solar PV	30	2018-2032	86	Fresno Co, CA
San Rafael Airport (FIT)	San Rafael Airport	Solar PV	0.972	2012-2031	1.4	San Rafael, CA
San Rafael Airport 2 (FIT)	San Rafael Airport	Solar PV	0.972	2019-2038	2	San Rafael, CA
Silveira Ranch A (FIT)	Silveira Ranch	Solar PV	0.999	2019-2038	2.6	Novato, CA
Silveira Ranch B (FIT)	Silveira Ranch	Solar PV	0.999	2019-2038	2.6	Novato, CA
Silveira Ranch C (FIT)	Silveira Ranch	Solar PV	0.999	2019-2038	2.6	Novato, CA
MCE Solar One	sPower	Solar PV	10.5	2017-2036	11-21	Richmond, CA
FPL Green Power Wind	FPL Energy	Wind	15.5	2019-2023	29.1	Riverside Co, CA
Harvest Wind	Morgan Stanley	Wind	Variable	2018-2020	75-90	Washington, Oregon
Los Banos Wind	Terra Gen	Wind	125	2020 -2031	372	Merced Co, CA
Portfolio	Powerex	Wind/Biomass	Variable	2017-2019	75 - 125	British Columbia, Washington
Portfolio	Powerex	Wind	Variable	2019-2020	25-50	British Columbia
Portfolio	3 Phases	Wind	Variable	2018- 2019	150-215	Colorado
Strauss Wind	BayWa	Wind	100	2020-2034	300	Lompoc, CA
TGP Energy Management	Terra Gen	Wind	100	2018 -2020	300	Tehachapi, CA
Voyager Wind III	Terra Gen	Wind	42	2018-2029	138	Mojave, CA
CARBON FREE						
BPA ACS Portfolio	WAPA/Direct	ACS	Variable	2018-2019	410	Pacific Northwest
Central Valley Project	WAPA	Hydro	Variable	2015-2024	25	California
Portfolio	Morgan Stanley	Hydro	Variable	2018-2020	160-330	Washington, Idaho
Middlefork/Ralston Powerhouses	Tenaska	Hydro	Variable	2018-2022	300-600	California
Colgate/Narrows Powerhouses	Shell	Hydro	Variable	2019	250	California
CONVENTIONAL						
SENA	Shell	System	Variable	2018-2020	623-739	California
Exelon Generation Company	Exelon Generation Company	System	50	2018-2019	438	California
Direct Energy	Energy America	System	Variable	2018-2020	310 - 484	California
Direct Energy	Energy America	System	Variable	2019	667	California
Morgan Stanley	Morgan Stanley	System	Variable	2019-2020	208-216	California
Morgan Stanley	Morgan Stanley	System	Variable	2016-2020	189-588	California

Current Resource Mix

MCE's anticipated 2019 resource mix, displayed in Figure 5, will contain approximately 91 percent renewable and carbon free energy - one of the highest renewable carbon free energy contents in California.

Figure 5: MCE 2019 Estimated Resource Mix[11]

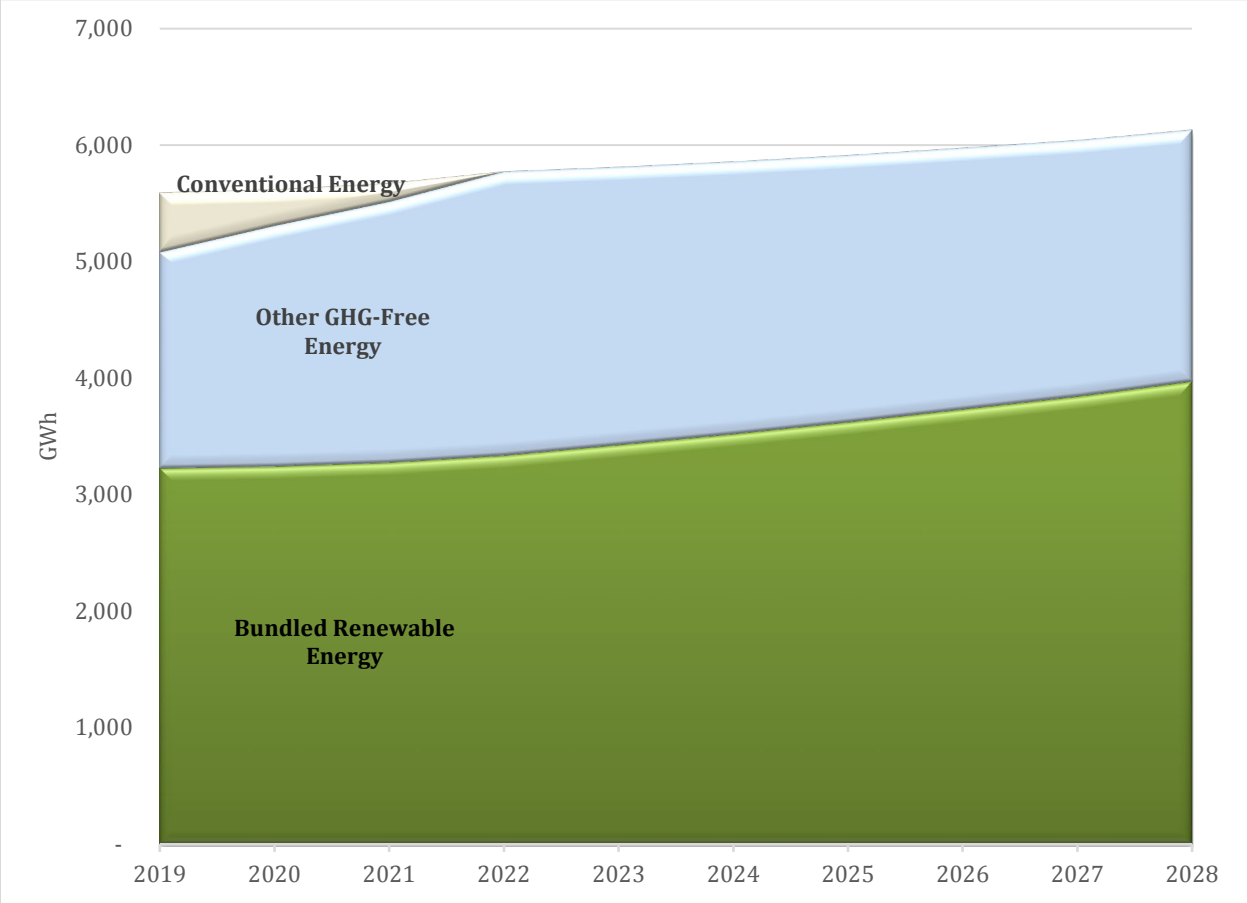


[11] Percentages may not sum to 100 percent due to rounding. Figures include all supply for the Light Green, Deep Green and Local Sol retail product offerings, in addition to the power that is lost to the distribution system (~6% of retail sales and sourced from large hydro)

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. MCE has established proportionate procurement targets for overall GHG-free energy content, including subcategories for various renewable energy products, and has also established targets for planning reserves. To the extent that MCE's energy needs are not fulfilled through the use of GHG-free generating resources, it should be assumed that such supply will be sourced from conventional energy sources, such as natural gas generating technologies or system power. System power describes energy purchases from the wholesale market that are not directly associated with specific generators.

Figure 6: MCE Renewable and Non-renewable Volumes (GWhs), 2019-2028[12]



[12] Figure 6 displays the types of resources required to meet MCE's loss-adjusted load (i.e., load including the power lost to the distribution system)

Renewable Resources

For the next four years (2019 through 2022), MCE's plan is to provide its Light Green customers with energy that is 60 percent renewable; incremental renewable energy quantities will also be procured on behalf of Deep Green program participants to ensure that such customers are provided with 100 percent renewable energy. MCE meets its renewable energy requirements with a combination of RPS-eligible energy products.[13] As Figure 7 illustrates, the proportion of MCE's resource mix that is sourced from bundled renewable energy products is expected to significantly increase as MCE transitions toward a 70 percent renewable energy content.

RPS Requirements

MCE's renewable power content significantly exceeds the state's minimum RPS requirements and will continue to do so throughout the Planning Period. SB 100 increases the renewable energy purchase requirement applicable to Load Serving Entities to 60 percent by 2030. Transitions from the previously applicable procurement mandate (33 percent by 2020) will be implemented gradually with "straight line" increases during each year of the compliance regime. To satisfy applicable procurement mandates, LSEs are allowed to purchase a variety of renewable energy products, including power produced by generating resources located within California and elsewhere in the Western Interconnection, the region covered by the Western Electricity Coordinating Council ("WECC"). MCE staff remains engaged in RPS-related proceedings to ensure a clear understanding and effective implementation of all applicable procurement requirements.

RPS compliance can be met with procurement from:

i) renewable resources located within or delivering electricity directly to a California Balancing Authority (PCC 1), subject to minimum procurement requirements;
ii) firmed and shaped renewable energy products produced outside of a California Balancing Authority (PCC 2), subject to certain quantity limitations; and
iii) unbundled renewable energy certificates from RPS-eligible resources (PCC 3), also subject to quantity limitations.

MCE anticipates a sufficient supply of RPS-eligible renewable resources to meet a 60 percent procurement target during the 2019 calendar year, well in excess of the applicable 31 percent RPS procurement requirement. Thereafter, MCE anticipates utilizing renewable energy supply from existing and future transactions to ensure that its use of renewable energy aligns with the planned trajectory reflected in this IRP. Based on targeted renewable energy percentages, MCE intends to significantly outpace California's annual RPS procurement mandates throughout the Planning Period.

[13] Some of MCE's renewable energy volumes are produced by facilities that are both RPS-eligible and Green-e Energy-eligible, according to eligibility criteria described in the Green-e Energy National Standard: http://www.green-e.org/docs/energy/Green-eEnergyNationalStandard.pdf.

RPS Open Positions

During the third RPS Compliance Period (2017 – 2020), MCE plans to procure 70 percent of its RPS target from PCC 1 resources. With this target in mind, MCE has substantially focused on long-term power purchase agreements ("PPAs") with new, California-based generating facilities that will produce PCC 1-eligible renewable energy.[14]

MCE's goal throughout the Planning Period is to maintain a "steady-state" procurement cycle of consistent annual volumes of longer-term renewable energy contracts. To supplement its core procurement of PCC 1 resources under long-term contracts, MCE engages in short-term contracts for PCC 1 and PCC 2 renewable energy supplies, if any, to balance and optimize its portfolio. As shown in Table 4, MCE has secured contracts for renewable energy volumes well in excess of applicable RPS procurement requirements.

Table 4: MCE RPS Compliance Energy Balance, 2019-2028

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retail Sales (GWh)	5,275	5,299	5,349	5,446	5,483	5,526	5,577	5,638	5,701	5,784
State RPS %	31%	33%	36%	39%	41%	44%	47%	49%	52%	55%
RPS Energy Required (GWh)	1,635	1,749	1,915	2,097	2,265	2,432	2,604	2,779	2,964	3,164
RPS Energy Contracted (GWh)	2,026	1,936	2,565	2,558	2,553	2,518	2,512	2,430	2,336	2,331
RPS Net Short/(Long)	**(391)**	**(187)**	**(650)**	**(462)**	**(288)**	**(87)**	**93**	**349**	**628**	**834**
RPS Category 1 Required (GWh)	1,226	1,312	1,436	1,573	1,698	1,824	1,953	2,085	2,223	2,373
RPS Category 1 Contracted (GWh)	1,666	1,936	2,565	2,558	2,553	2,518	2,512	2,430	2,336	2,331
RPS Category 1 Net Short/(Long)	(440)	(624)	(1,129)	(986)	(854)	(695)	(558)	(346)	(113)	42

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 and the 100 percent renewable energy supply for Deep Green customers. 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 2017 PCL, which is MCE's most recent, quantifies MCE's aggregate renewable energy use: 61 percent renewable for Light Green customers; and 100 percent renewable for Deep Green customers. In this example, all renewable energy volumes above the 2017 compliance mandate (27%) were fulfilled through voluntary renewable energy purchases. It should be noted that the 2017 Light Green renewable content was higher than MCE's 2017 internal target (53%) due to lower than expected load. Deviations from target due to weather and other unanticipated events are consistent with the normal operation of LSEs in California.

[14] 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.

Figure 7: MCE 2017 Power Content Label

2017 POWER CONTENT LABEL

ENERGY RESOURCES	2017 MCE LIGHT GREEN POWER MIX	2017 MCE DEEP GREEN POWER MIX	2017 MCE LOCAL SOL POWER MIX	2017 CA POWER MIX** (for comparison)
Eligible Renewable	**61%**	**100%**	**100%**	**29%**
Biomass & biowaste	6%	0%	0%	2%
Geothermal	10%	0%	0%	4%
Small hydroelectric	9%	0%	0%	3%
Solar	9%	50%	100%	10%
Wind	27%	50%	0%	10%
Coal	**0%**	**0%**	**0%**	**4%**
Large Hydroelectric	**26%**	**0%**	**0%**	**15%**
Natural Gas	**5%**	**0%**	**0%**	**34%**
Nuclear	**0%**	**0%**	**0%**	**9%**
Other	**1%**	**0%**	**0%**	**<1%**
Unspecified sources of power*	**6%**	**0%**	**0%**	**9%**
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 sold to California consumers during the identified year.

For specific information about these electricity products, contact:	**MCE** 1 (888) 632-3674 info@ mceCleanEnergy.org
For general information about the Power Content Label, contact the California Energy Commission at:	1 (844) 454-2906 www.energy.ca.gov/pcl

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.

Deep Green Service

MCE offers a voluntary 100 percent renewable energy option, known as Deep Green service, to all customers. 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 used to cover the pre-development and other costs of local projects, such as for the MCE Solar One 10.5 MW solar PV project in Richmond, California. As a result, increased participation in Deep Green not only reduces a customer's electricity-related GHG emissions, but also supports local project development and, by extension, creates economic benefits and associated local "green-collar" jobs within MCE's service area.

Deep Green usage currently represents approximately 3.5% of MCE total retail electricity sales. In 2017, MCE Deep Green sales totaled 107 GWh; in 2018, Deep Green sales are projected to increase to 160 GWh[15], as private and public sector commercial customers are opting up to Deep Green service to achieve

[15]MCE's 2018 Deep Green sales projection is derived on the basis of sales through 6/30/18 and monthly Deep Green projections through 12/31/18

their sustainability goals and meet emissions reduction targets. As of 6/30/18, more than half of MCE member municipalities have enrolled their government accounts in Deep Green service, with 16 of these member municipalities enrolling all of their accounts.

Table 5: MCE Deep Green Participation, as of June 2018[16]

Table 5	Total MCE	Residential Deep Green	Commercial Deep Green	Total Deep Green
Number of Customers	471,137	6,816	2389	9,205
		1.45%	0.51%	1.95%
Total Retail Sales (MWh)	4,523,279	27,000	133,000	160,000
		0.60%	2.94%	3.54%

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 percent 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.

Table 6: MCE Local Sol Participation, 2018[17]

Project Name	Program Capacity (Customer Accounts)	Energy (MWh/year)	Currently Enrolled (Customer Accounts)	Currently Enrolled (MWh/year)
Cooley Quarry	~300	2,885	175	874

[16] Total Deep Green participants as of June 2018, the most recent month for which data are available. Sales for the first half of 2018 have been extrapolated through the balance of the year. Percentages indicate portion of total MCE customers and retail sales, respectively.

[17] Local Sol service capacity is based on usage of enrolled customers. As of August 2018, 170 customer accounts – of an estimated capacity of 300 – have enrolled.

The remaining open positions related to MCE's future voluntary renewable energy targets for Light Green and Deep Green service options are shown in Table 7.

Table 7: MCE Renewable Energy Balance, 2019-2028

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Light Green Renewable Content Goal %	60%	60%	60%	60%	61%	63%	64%	65%	66%	68%
Light Green Renewable Energy Target (GWh)	3,063	3,075	3,101	3,157	3,242	3,332	3,428	3,531	3,638	3,759
Deep Green Incremental Renewable Energy Target (GWH)	170	175	180	185	190	195	200	205	210	215
Contracted Renewable Energy (GWh)	2,026	1,936	2,565	2,558	2,553	2,518	2,512	2,430	2,336	2,331
Renewable Net Short/(Long)	**1,207**	**1,314**	**716**	**783**	**879**	**1,009**	**1,116**	**1,306**	**1,512**	**1,644**

GHG-Free Resources

MCE has outlined a specific GHG-free procurement goal of 90 percent in 2019, with increases each year thereafter until MCE achieves a 100 percent GHG-free resource mix in 2022. MCE acknowledges that achieving a 100 percent GHG-free resource mix will be dependent upon successful resolution of operational practicalities, applicable GHG reporting practices (such as those contemplated in AB 1110), and product availability. To achieve these GHG-free supply goals, MCE will require additional GHG-free energy throughout the Planning Period, as reflected in Table 8.

Table 8: MCE GHG-Free Energy Balance, 2019-2028 (GWh)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retail Sales (GWh)	5,275	5,299	5,349	5,446	5,483	5,526	5,577	5,638	5,701	5,784
Light Green GHG-Free Target (%)	90%	94%	97%	100%	100%	100%	100%	100%	100%	100%
Light Green GHG-Free Target (GWh)	4,595	4,817	5,014	5,261	5,293	5,331	5,377	5,433	5,491	5,569
Total Retail GHG-Free Target (GWh)	4,765	4,992	5,194	5,446	5,483	5,526	5,577	5,638	5,701	5,784
GHG-Free Under Contract (GWh)	3,331	2,750	3,190	3,183	2,578	2,543	2,537	2,455	2,361	2,356
Renewable Energy Open Position (GWh)	1,207	1,314	716	783	879	1,009	1,116	1,306	1,512	1,644
GHG-Free Open Position (GWh)	**227**	**928**	**1,288**	**1,480**	**2,026**	**1,974**	**1,924**	**1,876**	**1,828**	**1,785**
Incremental GHG-Free Needed to Account for Distribution Losses (GWh)	317	318	321	327	329	332	335	338	342	347
Total GHG-Free Open Position (GWh)	**543**	**1,246**	**1,608**	**1,806**	**2,355**	**2,306**	**2,259**	**2,215**	**2,170**	**2,132**

System Energy

MCE utilizes fixed-price energy contracts to hedge market price exposure associated with its load, which can arise due to open positions in its supply portfolio, intermittent deliveries from variable energy resources ("VERs"), or via energy supply contracts that include market index-based prices. Consistent with its mission to reduce GHG emissions, MCE prioritizes renewable and GHG-free energy resources when evaluating hedge contracts; to the extent that resource economics or market availability dictate, MCE also utilizes fixed-price contracts for unspecified source system energy or specified source natural gas fueled

generation to stabilize its retail rates.[18] MCE purchases system energy or conventional generation via short- and intermediate-term contracts or via the CAISO markets.

Capacity Resources

MCE meets California's Resource Adequacy program requirements by procuring qualifying capacity sufficient to meet MCE's projected peak demand plus a 15 percent reserve margin. In addition to this general requirement, MCE must ensure that mandated proportions of such capacity resources are procured from local reliability areas defined by the CAISO. As of 6/30/2018, MCE had a need for capacity purchases to meet its 2019 RA obligations. RA purchases are generally conducted via short and medium term transactions, consistent with the obligations under California's RA program. MCE is actively engaged in procurement processes related to open positions for the balance of 2019 and has also addressed portions of its anticipated obligations in future years through multi-year RA contracts. In addition, MCE has long-term capacity rights under several of its PPAs, which will provide a portion of MCE's local RA needs during the Planning Period. MCE has practices and procedures in place to fully comply with all of its RA obligations.

Table 9: MCE Resource Adequacy Capacity Balance, 2019-2028 (MW)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Net Peak Demand	1,048	1,040	1,044	1,069	1,068	1,069	1,073	1,084	1,095	1,109
Total RA Contracted: System, Local, Flex	840	721	650	355	355	199	199	204	204	204
Net Short / (Long)	207	319	394	714	713	871	875	880	890	905

Flexible Capacity

The CAISO, in collaboration with the CPUC and other local regulatory authorities, must ensure that the electric system has sufficient flexibility, including load-following capabilities, to address unexpected system variability. Thus, the CAISO introduced flexible capacity compliance mandates for LSEs in 2015. Each LSE must demonstrate procurement of 90 percent of its flexible capacity requirement on its annual RA filing and 100 percent of the specified requirement on its subsequent monthly RA filings. Flexible capacity capabilities of resources such as distributed generation, DR, and energy storage should ultimately count toward an LSE's flexible capacity procurement obligation. MCE has successfully satisfied and expects to continue successfully satisfying all flexible capacity mandates.

Table 10: MCE Flexible Capacity Targets (MW), 2019

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
313	300	263	256	238	225	200	200	288	288	300	331

Energy Storage

MCE intends to explore additional opportunities for ownership of and contracting with larger 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] MCE policy prohibits unit-specific purchases from coal or nuclear generation facilities.

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 development of 35 MW of new renewable resources within its service area by 2021. Toward this goal, MCE may consider direct project investment or ownership of generation assets and 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 over-runs, 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.

MCE Solar One – Local Solar Development

In September of 2014, MCE entered into an option agreement to lease 60 acres from Chevron Products Company ("CPC") at the Richmond oil refinery for the development of a solar PV installation up to 12 MW. MCE's status as a California Joint Powers Authority and the public benefit to be derived from this project were key factors in CPC's decision to lease the property to MCE. Over a period of three years, MCE completed pre-development activities for the project, and MCE then engaged a developer who financed

and built the 10.5 MW installation, aptly named MCE Solar One. MCE views this as a model for future solar development on brownfield sites in its service area. The project is the largest public-private solar installation in the San Francisco Bay Area. MCE Solar One began commercial operation in December 2017, delivering renewable energy to MCE customers from a local renewable resource that would otherwise not have been developed.

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. These factors are taken into consideration when MCE engages the market.

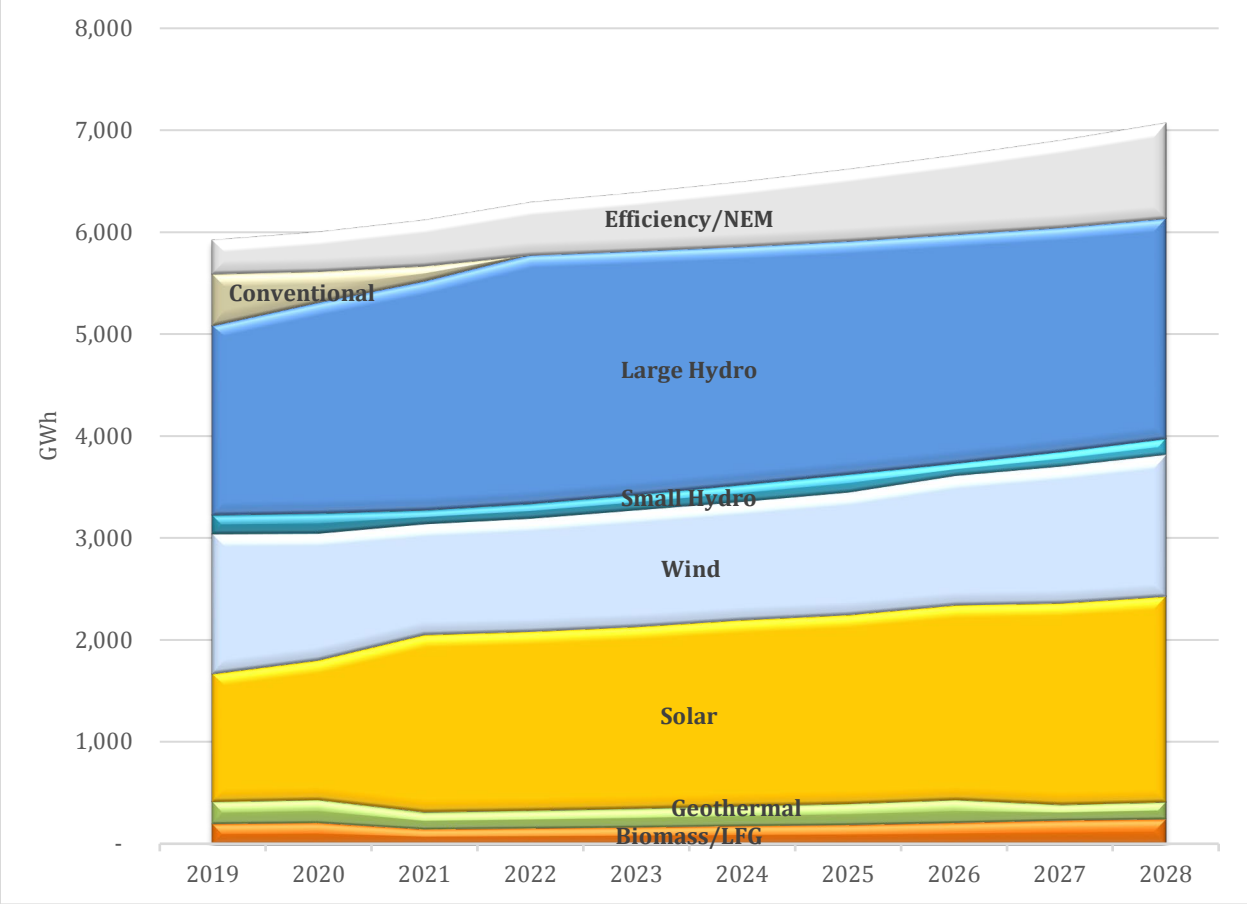
MCE continually manages its forward load obligations and supply commitments with the objective of balancing cost stability and cost minimization, while leaving some flexibility to take advantage of market opportunities or technological improvements that may arise. MCE monitors its open position separately for each renewable resource category, GHG-free resources, conventional resources, and on a total portfolio basis. MCE maintains portfolio coverage targets of up to 100 percent in the near-term (0 to 5 years) and leaves a greater portion open in the mid 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. Recent market data suggest that midday peak resources are likely to comprise a larger proportion of California's renewable supply portfolio due to the rapid decline in prices for solar PV generation projects and the abundance of such projects in development. Additions to MCE's portfolio during the Planning Period will likely be more heavily weighted toward energy resources – be they dispatchable, shaped during non-solar or ramping periods, or otherwise – that complement competitively priced solar. MCE may also engage in purchases from as-available renewable generation (e.g. wind) to the extent that it is competitively priced or otherwise provides portfolio balance.

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 in Figure 8.

Figure 8: Projected MCE Resource Mix (GWh), 2019-2028[19]



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.

MCE's initial FIT program, which offered 15 MW of capacity to projects sized up to 1 MW is fully subscribed. 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]

[19] Figure 8 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.
[20] https://www.mcecleanenergy.org/feed-in-tariff/.

Table 11: MCE Feed-In Tariff Projects

Project Name	Project Status	Capacity (kW)	Annual Output (MWh)	Commercial Operation Date
San Rafael Airport	Operational	972	1,440	October 2012
Freethy Industrial Park Unit #1	Operational	998	1,800	October 2016
Freethy Industrial Park Unit #2	Operational	998	1,800	October 2016
Cost Plus Plaza	Operational	261	520	September 2016
Hayworth-Fabien, LLC (Oakley)	Operational	990	1,750	July 2018
TOTAL		**4,219**	**7,310**	

GHG-Free Power Purchases

MCE anticipates that its GHG-free energy supplies will be substantially met through short-, medium-, and long-term purchases of GHG-free energy sources, particularly renewable energy and regionally produced hydroelectricity. As previously noted, MCE will not engage in unit-specific purchases from nuclear generators to meet its GHG-free power supply objectives.

System Resources and Specified Conventional Power Purchases

MCE may engage in purchases of unspecified system energy or unit specific purchases from natural gas-fueled generation. Energy products may include peak, off-peak, baseload, and shaped energy. MCE may purchase system and specified conventional energy or capacity through fixed price forward contracts or through tolling agreements. Purchases of system energy will typically be for short- and medium-term lengths (< 5 years). Unit-specific and tolling agreements may address MCE's short-, medium- and long-term needs. Natural gas purchases associated with tolling agreements will typically be for short to medium terms.

Total Supply Obligations

With respect to MCE's total supply and 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 12: MCE Power Supply 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%

As MCE contracts for system energy and capacity, these contracting guidelines 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.

Reserve Capacity Purchases

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. Capacity 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;
- 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, like its annual 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 urgent 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
October 2018

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
I. Energy Requirements (GWh)										
Baseline Retail Load	5,535	5,562	5,590	5,618	5,646	5,674	5,703	5,731	5,760	5,789
Energy Efficiency	(10)	(15)	(21)	(28)	(33)	(39)	(46)	(54)	(62)	(62)
Distributed Generation	(325)	(374)	(430)	(494)	(544)	(598)	(658)	(724)	(796)	(876)
Electric Vehicle Load	75	125	210	350	414	489	579	684	799	933
Retail Load (Net of EE/DG/EV)	5,275	5,299	5,349	5,446	5,483	5,526	5,577	5,638	5,701	5,784
Distribution Line Losses and Unaccounted For Energy	317	318	321	327	329	332	335	338	342	347
Total Energy Requirements	**5,592**	**5,617**	**5,670**	**5,773**	**5,812**	**5,858**	**5,912**	**5,976**	**6,043**	**6,131**
II. Volume Targets										
Light Green Renewable Energy Volume Targets (GWh)										
Portfolio Content Category 1	2,144	2,152	2,171	2,210	2,269	2,332	2,400	2,472	2,546	2,632
Portfolio Content Category 2	919	922	930	947	973	1,000	1,028	1,059	1,091	1,128
Portfolio Content Category 3 (REC Only)	-	-	-	-	-	-	-	-	-	-
Subtotal, Light Green Renewable Energy Volume Targets	3,063	3,075	3,101	3,157	3,242	3,332	3,428	3,531	3,638	3,759
Deep Green Incremental Renewable Energy Volume Targets (GWh)										
Portfolio Content Category 1	170	175	180	185	190	195	200	205	210	215
Subtotal, Deep Green Incremental Renewable Energy Volume Targets	170	175	180	185	190	195	200	205	210	215
Large Hydro/Carbon Free Energy Volume Targets (GWh)	1,848	2,060	2,233	2,431	2,380	2,331	2,284	2,240	2,195	2,157
System/Conventional Energy Volume Targets (GWh)	**511**	**307**	**155**	**0**	**0**	**0**	**(0)**	**0**	**(0)**	**0**
III. Contracted Resources										
Renewable Resources Under Contract (GWh)										
Portfolio Content Category 0	-	-	-	-	-	-	-	-	-	-
Portfolio Content Category 1	1,666	1,936	2,565	2,558	2,553	2,518	2,512	2,430	2,336	2,331
Portfolio Content Category 2	360	-	-	-	-	-	-	-	-	-
Portfolio Content Category 3 (REC Only)	-	-	-	-	-	-	-	-	-	-
Subtotal, Renewable Resources Under Contract	2,026	1,936	2,565	2,558	2,553	2,518	2,512	2,430	2,336	2,331
Large Hydro/Carbon Free Resources Under Contract (GWh)	1,305	814	625	625	25	25	25	25	25	25
System Energy Under Contract (GWh)	2,736	1,447	-	-	-	-	-	-	-	-
Total Contracted Energy (GWh)	6,067	4,197	3,190	3,183	2,578	2,543	2,537	2,455	2,361	2,356
Less Variable Price Contracted Energy (GWh)	*1,835*	*959*	*670*	*670*	*70*	*70*	*70*	-	-	-
Total Fixed Price Contracted Energy (GWh)	***4,232***	***3,238***	***2,520***	***2,513***	***2,508***	***2,473***	***2,467***	***2,455***	***2,361***	***2,356***
IV. Open Positions										
Renewables Open Position (GWh)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Portfolio Content Category 1	648	391	(214)	(164)	(93)	9	88	246	420	516
Portfolio Content Category 2	559	922	930	947	973	1,000	1,028	1,059	1,091	1,128
Portfolio Content Category 3	-	-	-	-	-	-	-	-	-	-
Total Renewables Open Position (GWh)	**1,207**	**1,314**	**716**	**783**	**879**	**1,009**	**1,116**	**1,306**	**1,512**	**1,644**
Large Hydro/Carbon Free Open Position (GWh)	543	1,246	1,608	1,806	2,355	2,306	2,259	2,215	2,170	2,132
Total Open Market Energy Volumes (GWh)	***1,360***	***2,380***	***3,150***	***3,260***	***3,304***	***3,385***	***3,445***	***3,520***	***3,682***	***3,776***
Total Market Price Contract Coverage (%)	***76%***	***58%***	***44%***	***44%***	***43%***	***42%***	***42%***	***41%***	***39%***	***38%***
Conventional Hedge Summary										
Conventional Energy Requirements	511	307	155	-	0	0	(0)	0	(0)	0
Plus Hedge for Short PCC3 Position	-	-	-	-	-	-	-	-	-	-
Plus Hedge for Short PCC2 Position	559	922	930	947	973	1,000	1,028	1,059	1,091	1,128
Plus Hedge for Short Carbon Free Position	543	1,246	1,608	1,806	2,355	2,306	2,259	2,215	2,170	2,132
Less Excess PCC1 Volumes	-	-	(214)	(164)	(93)	-	-	-	-	-
Less Null Energy Contracts	(2,736)	(1,447)	-	-	-	-	-	-	-	-
Plus Variable Price Contract Volume	1,835	959	670	670	70	70	70	-	-	-
Open Volumes Net of Planned PCC1 Purchases	**712**	**1,988**	**3,150**	**3,260**	**3,304**	**3,375**	**3,357**	**3,274**	**3,262**	**3,260**
Market Price Contract Coverage Net of Planned PCC1 Purchases (%)	87%	65%	44%	44%	43%	42%	43%	45%	46%	47%

Appendix B: Description of Resources as of 6/30/2018

Bundled Renewable Energy Resources

Calpine Energy Services (Geothermal): bundled renewable energy, conventional energy, and capacity

MCE receives geothermal energy produced by the Geysers Project in Lake and Sonoma Counties, CA. The Geysers will provide 88,000 MWh of renewable energy annually and associated capacity throughout the ten-year term that expires in 2026.

Genpower LLC (Landfill Gas): bundled renewable energy and capacity

Deliveries under the Genpower agreement began in February 2013 and extend for a twenty-year term until 2024. Located in Lincoln, CA, these resources include an existing 2.4 MW landfill gas project, which was expanded to 4.8 MW of renewable generating capacity. MCE is currently receiving renewable energy and capacity attributes from both engines at a combined average capacity of 3.55 MW. Annual Energy deliveries are estimated to be 27,000 MWh.

G2 Energy LLC/ Hay and Ostrom Road (Landfill Gas): bundled renewable energy and capacity

MCE has two agreements with G2 Energy LLC, each relating to a unique renewable generating project. The first, G2 Hay Road, extends for twenty years from the July 2013 commercial operation date and supported construction of a new, 1.6 MW landfill gas project located in Solano County, CA. The second, G2 Ostrom Road, facilitated a 1.6 MW expansion of an existing landfill gas facility in Yuba County, CA and extends for an eighteen-year term from the commercial operation date in September 2013. Both facilities provide MCE with an estimated 23,000 MWh of baseload renewable energy and associated capacity attributes annually.

Waste Management – Redwood Landfill (Landfill Gas): bundled renewable energy and capacity

Located in Novato, CA, the Redwood Landfill power generation facility achieved commercial operation in September 2017. MCE receives approximately 30,000 MWh of renewable energy and associated capacity annually from this the state-of-the-art 4 MW project through 2037.

East Bay Municipal Utility District – Pardee and Camanche Reservoirs (RPS-Eligible Hydroelectric): bundled renewable energy

MCE entered into a ten-year PPA with East Bay Municipal Utility District ("EBMUD") for renewable energy deliveries from two existing RPS-eligible hydroelectric facilities near the Amador-Calaveras county line on the Mokelumne River. Both hydro power plants, which are owned and managed by EBMUD, provide 20,000 to 180,000 MWh of RPS-eligible generation per year, depending on annual precipitation; for planning purposes, MCE forecasts 70,000 MWh of annual production.

American Canyon Solar A, B and C Feed-in Tariff Projects (Solar PV): bundled renewable energy

American Canyon Solar A, B and C are three FIT projects located in Napa County. Each project has a 999 kW capacity with expected annual energy deliveries of approximately 2,759 MWh. The units are expected to come online in Q3 2019.

Antelope Expansion 2, LLC (Solar PV): bundled renewable energy and capacity

The Antelope Expansion 2 project will comprise 105 MW of solar capacity in the western Mojave Desert in Southern California. Once online in November of 2018, the Antelope Expansion 2 facility is annually expected to deliver 300,000 MWh of renewable energy and associated capacity over the term of its twenty-year PPA.

Central Marin Sanitation Agency CMSA Feed-In Tariff Project (Bio Gas): bundled renewable energy

This FIT project is located in San Rafael, CA. MCE will purchase excess generation capacity up to 750 kWs from the existing methane gas generator. The volumes will vary depending on fuel load, with expected capacity ranging from 150 kW to a max capacity of 750 kW. This FIT contract has a 10 year term, and is expected to reach commercial operation in Q1 2019 with expected annual energy deliveries of approximately 1,314 MWh.

Cooley Quarry Project – MCE Local Sol (Solar PV): renewable energy

The Cooley Quarry project achieved commercial operation in July 2017 and is delivering local solar energy for MCE customers who have opted into the Local Sol program. The 990 kW project is located in Novato, CA and delivers approximately 2,885 MWh annually over the term of its twenty-year PPA.

Cost Plus Plaza Larkspur Feed-In Tariff Project (Solar PV): bundled renewable energy

This 261 kW roof-mounted FIT project is located in Larkspur, CA and declared commercial operation in September 2016. Energy deliveries are approximately 520 MWh per year during the twenty-year contract term.

Cottonwood Solar LLC (Solar PV): bundled renewable energy and capacity

Cottonwood Solar began delivering renewable energy to MCE in May 2015 and will do so for a twenty-five-year term. This agreement incorporates generation from three solar facilities, which provide MCE annually with approximately 64,000 MWh of renewable energy and associated capacity:

i. City of Corcoran Solar, located in Kings County, is a 11 MW solar project that commenced commercial operation in May 2015;
ii. Goose Lake Solar, located in Kern County, is a 12 MW generation facility that has also been delivering to MCE since May 2015; and
iii. The Marin Carport solar project, located in Novato, CA is a 1 MW carport-mounted solar project that achieved commercial operation in July 2016. Negotiated as part of the larger Cottonwood Solar contract to provide additional community benefit, this project is especially unique in that it delivers energy locally and provides shaded parking for employees of a non-profit research facility.

Desert Harvest, LLC (Solar PV): bundled renewable energy and capacity

Pursuant to its twenty-year PPA with MCE, Desert Harvest is developing an 80 MW solar facility in Riverside County, CA that is expected to be online in December 2020. Once operational, the project will deliver an estimated 256,000 MWh of renewable energy and associated capacity annually to MCE. In addition, MCE holds an option to expand the PPA and the facility to 150 MW if it determines that market conditions or potential expansion of MCE service area warrant doing so.

DRES Quarry, LLC Feed-in Tariff Project (Solar PV): bundled renewable energy

This 100 kW addition to the Novato based Cooley Quarry project is expected to achieve commercial operation in Q1 2019. The generating facility will deliver approximately 285 MWhs of solar energy to MCE customers under a twenty-year PPA.

Small World Trading Company Feed-in Tariff Project (Solar PV): bundled renewable energy

Located on the roof of the EO Products facility in San Rafael, this 56kW FIT project is expected to come online in Q4 of 2018 and deliver 112 MWh of solar energy annually.

Freethy Industrial Park Feed-In Tariff Projects #1 and #2 (Solar PV): bundled renewable energy

Both of these co-located FIT projects came online in October 2016. Located in Richmond, CA, the two 998 kW agreements will extend for a twenty-year term. Aggregate energy deliveries from the projects are approximately 3,600 MWh per year during the contract term.

Great Valley Solar 1, LLC (Solar PV): bundled renewable energy and capacity

The Great Valley Solar 1 PPA provides approximately 290,000 MWh of renewable energy and capacity annually from the 100 MW solar project in Fresno County, CA. Great Valley Solar 1 achieved commercial operation in April 2018 and will deliver to MCE for fifteen years.

Little Bear Solar (Solar PV): bundled renewable energy and capacity

Little Bear Solar is a 160 MW aggregation of four solar projects in Fresno County, CA that may come online in September 2020 and annually deliver 430,000 MWh of renewable energy and capacity to MCE over the term of a twenty-year PPA.

CED Lost Hills Solar, LLC (Solar PV)): bundled renewable energy

CED Lost Hills Solar provides 50,000 MWh of bundled renewable energy in 2019 from solar resources located in California.

Oakley RV and Boat Storage, Feed-in Tariff Project (Solar PV): bundled renewable energy

Hayworth-Fabien, LLC's Oakley RV and Boat Storage project achieved commercial operation in July 2018. A unique solar carport structure covering an RV and boat storage facility in the city of Oakley, the 990 kW project delivers 1,750 MWh annually over the term of its twenty-year PPA.

Palm Drive Solar A, B and C Feed-in Tariff Projects (Solar PV): bundled renewable energy

Palm Drive Solar A, B and C are three FIT projects located in Napa County with an expected COD of Q3 of 2019. Each project has a 999 kW capacity and is expected to deliver approximately 2,800 MWh annually over its twenty-year PPA.

RE Mustang LLC (Solar PV): bundled renewable energy and capacity

RE Mustang is a 30 MW solar facility in Fresno County, CA, construction of which was enabled by its fifteen-year PPA with MCE. MCE receives approximately 86,000 MWh of renewable energy annually and associated capacity from RE Mustang.

San Rafael Airport Feed-In Tariff Project (Solar PV): bundled renewable energy

The San Rafael Airport FIT agreement extends for a twenty-year term, which commenced on the facility's commercial operation date of October 23, 2012. The 972 kW solar PV project, which was the largest solar facility ever constructed in Marin County at the time, is located in San Rafael, California and generates approximately 1,440 MWh per year during the contract term.

San Rafael Airport Feed-In Tariff Project II (Solar PV): bundled renewable energy

The San Rafael Airport FIT II agreement extends for a twenty-year term from the facility's projected commercial operation date of Q3 2019. The 972 kW solar PV project is located in San Rafael, California and will generate approximately 2,000 MWh per year during the contract term.

Silveira Ranch A, B & C Feed-In Tariff Project II (Solar PV): bundled renewable energy

The Silveira Ranch A, B & C FIT agreements extend for a twenty-year term from the facilities' projected commercial operation dates of Q4 2019. Each facility is 999 kW and located in Novato, CA. Each facility is projected to generate approximately 2,600 MWh per year during the contract term.

MCE Solar One (Solar PV): bundled renewable energy

After completing all pre-development activities in early 2017, MCE turned over the development of MCE Solar One to financier and project owner Sustainable Power Group (sPower). The construction commenced in July and was completed and on-line by the end of December 2017. MCE Solar One generates approximately 22,000 MWh per year. MCE Solar One supported over 82,000 hours of union labor and is expected to generate power for at least 3,400 homes. The labor report for the project documented nearly 83,000 work hours, of which 40 percent was union labor and almost 50 percent included hours worked by local Richmond residents. By partnering with local workforce development partner, RichmondBUILD, MCE was able to support specific training, retooling, and career opportunities for low-income, minority, and disadvantaged community members by providing the skills and experience needed to work in the green-collar economy.

FPL Green Power Wind, LLC (Wind): bundled renewable energy

The agreement with NextEra is a five-year PPA with The Green Power Wind Farm. This 15.5 MW project is located in Riverside County, CA. The agreement for this existing facility begins in 2019 and runs through 2023. MCE will receive approximately 29,100 MWh of renewable energy and associated capacity per year.

Harvest Wind/Morgan Stanley (Wind): bundled renewable energy

Morgan Stanley will deliver to MCE from 2018-2020 at least 75,000 MWh/year with an option to increase deliveries to 90,000 MWh/year of bundled renewable energy from a portfolio of existing wind resources in Oregon and Washington.

Los Banos Wind, LLC (Wind): bundled renewable energy and capacity

Los Banos Wind project is a 125 MW wind facility in Merced County, CA. Los Banos is contracted to deliver annually 372,000 MWh of renewable energy and capacity over the twelve-year term of the PPA. In order to incorporate into its portfolio similar in-state wind deliveries prior to 2020, MCE has contracted with TGP Energy Management, LLC, an affiliate of Los Banos Wind, to deliver approximately 300,000 MWh per year of renewable energy from existing wind resources near Tehachapi, CA beginning in January 2018 (see "TGP Energy Management" description below).

Powerex (Wind, Biomass): bundled renewable energy

Powerex will deliver 125,000 MWh to MCE in 2019 from a resource portfolio comprised largely of wind facilities in British Columbia as well as a smaller biomass generator in Washington.

Powerex (Wind): bundled renewable energy

Powerex will deliver to MCE 50,000 MWh in 2019 and 25,000 MWh in 2020 of bundled renewable energy from a portfolio of existing wind resources in British Columbia.

3 Phases Renewables, LLC (Wind): bundled renewable energy

3 Phases will deliver to MCE between 160,000-215,000 MWh in 2019 of bundled renewable energy from a portfolio of existing wind resources in Colorado.

Strauss Wind, LLC (Wind): bundled renewable energy and capacity

MCE entered into a 15-year PPA with Strauss Wind, LLC for a 100 MW wind project located in Santa Barbara County. The project, which is expected to achieve commercial operation in April 2020, is expected to deliver 300,000 MWh of wind produced energy annually.

TGP Energy Management (Wind): bundled renewable energy

TGP Energy Management delivers to MCE approximately 300,000 MWh per year of bundled renewable energy from existing wind resources near Tehachapi, CA from 2018-2020.

Voyager Wind III, LLC (Wind): bundled renewable energy and capacity

The Voyager Wind III project, located near Mojave, CA, will be 42 MW once operational in December 2018. MCE has contracted with Voyager to deliver an estimated 138,000 MWh of renewable energy and associated capacity each year of its twelve-year term.

GHG-free Resources

Bonneville Power Administration (BPA) ACS Portfolio (Large Hydroelectric ACS): Low-GHG energy

BPA, a federal power marketing agency, has an ACS portfolio registered by CARB for its low GHG emissions factor. BPA's power supply comes from a number of energy resources. The vast majority of the electricity BPA markets is hydropower generated by the 31 federal dams on the Columbia and Snake rivers. BPA's

portfolio does include some emissions, however, and this is due to BPA's need to firm and shape its supply for its 140 utility and direct-service industrial customers in four states across the Northwest. MCE contracts for BPA's ACS portfolio through WAPA and Direct Energy, both of which provide transmission capacity for the power, and currently has agreements in place to purchase approximately 410,000 MWh of low-GHG ACS energy in 2019.

U.S. Western Area Power Administration ("WAPA", Large Hydroelectric): GHG-free energy

Under the WAPA agreement, MCE receives a specified allocation of hydroelectric energy produced by the federally owned Central Valley Project in California. These GHG-free energy deliveries, which are projected to average 25,000 MWh under typical hydrological conditions, began in January 2015 and will continue for the PPA's ten-year term until 2024.

Morgan Stanley (Large Hydroelectric): GHG-free energy

Morgan Stanley will deliver to MCE 330,000 MWh in 2019 and 189,000 MWh in 2020 of GHG-free energy from a portfolio of existing large hydro resources in Washington and Idaho.

Placer County Water Agency/Tenaska/Middlefork and Ralston Powerhouses ("PCWA," Large Hydroelectric): GHG-free energy

PCWA owns and operates Middlefork and Ralston Powerhouses on the Middlefork American River. MCE has contracted with PCWA/Tenaska for 300,00 MWh of GHG-free deliveries in 2019 and 600,000 MWh of GHG free deliveries annually from 2020-2022.

Yuba County Water Agency/Shell/Colgate and Narrows Powerhouses ("YCWA," Large Hydroelectric): GHG-free energy

YCWA manages a modern series of dams and hydropower facilities, generating up to 395 megawatts of GHG-free energy, which is enough to supply more than 300,000 homes throughout California. It owns and operates three separate powerhouses on the Yuba River: the New Colgate Powerhouse, Narrows 2 Powerhouse, and the New Bullards Bar minimum instream flow powerhouse. The Narrows 2 Flow Bypass has received recognition from the National Hydropower Association for benefits to fish-spawning grounds downstream on the Yuba River. MCE has contracted with YCWA for GHG-free deliveries in 2019 that total 250,000 MWh.

Conventional Energy Resources

Shell Energy North America: system energy

Under the agreement with Shell, MCE will receive approximately 667,000 MWh in 2019 and 739,000 MWh in 2020 of system energy.

Exelon Generation Company: system energy

Under the agreement with Exelon, MCE will receive 50 MW of system energy during 2019. These deliveries will compliment MCE's intermittent resources and offset approximately 438,000 MWh of the system energy each year that has been previously provided by other suppliers.

Direct Energy/Energy America, LLC: system energy

The Direct Energy agreement is a three-year energy supply confirmation that will compliment MCE's renewable and intermittent resources from 2018 to 2020 with consistent and competitively priced energy that will offset 310,000 MWh to 484,000 MWh annually that have been previously delivered by other suppliers.

Direct Energy/Energy America, LLC: system energy

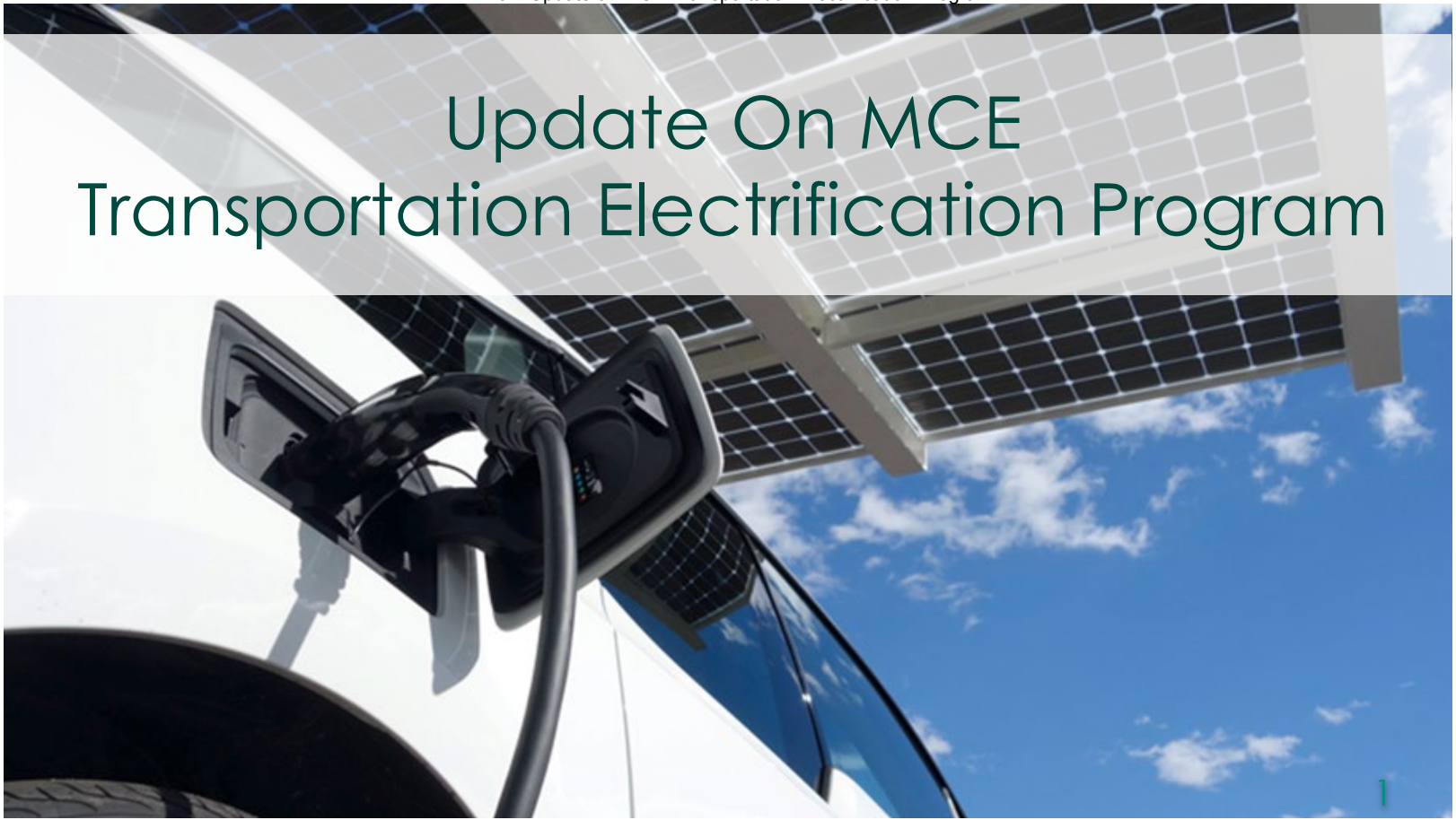
Under the agreement with Direct, MCE will receive approximately 667,000 MWh of system energy in 2019.

Morgan Stanley: system energy

Under the agreement with Morgan Stanley, MCE will receive approximately 438,000 MWh in 2019 and 189,000 MWh in 2020 of system energy.

Morgan Stanley: system energy

Under the agreement with Morgan Stanley, MCE will receive approximately 216,000 MWh in 2019 and 208,000 MWh in 2020 of system energy.



Update On MCE Transportation Electrification Program

Agenda

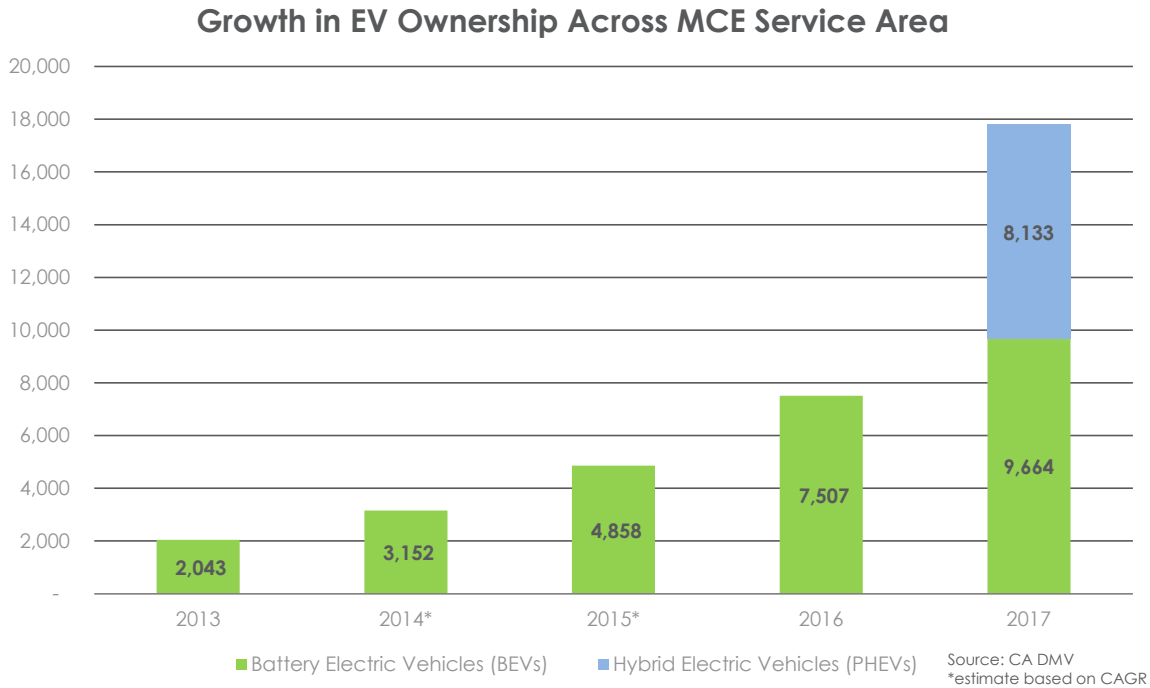
1. Market Primer & Program Reminder
2. Progress to Date
3. FY18/19 Budget & Ensuring Certainty to Customers
4. Opportunities beyond FY18/19

The Rationale

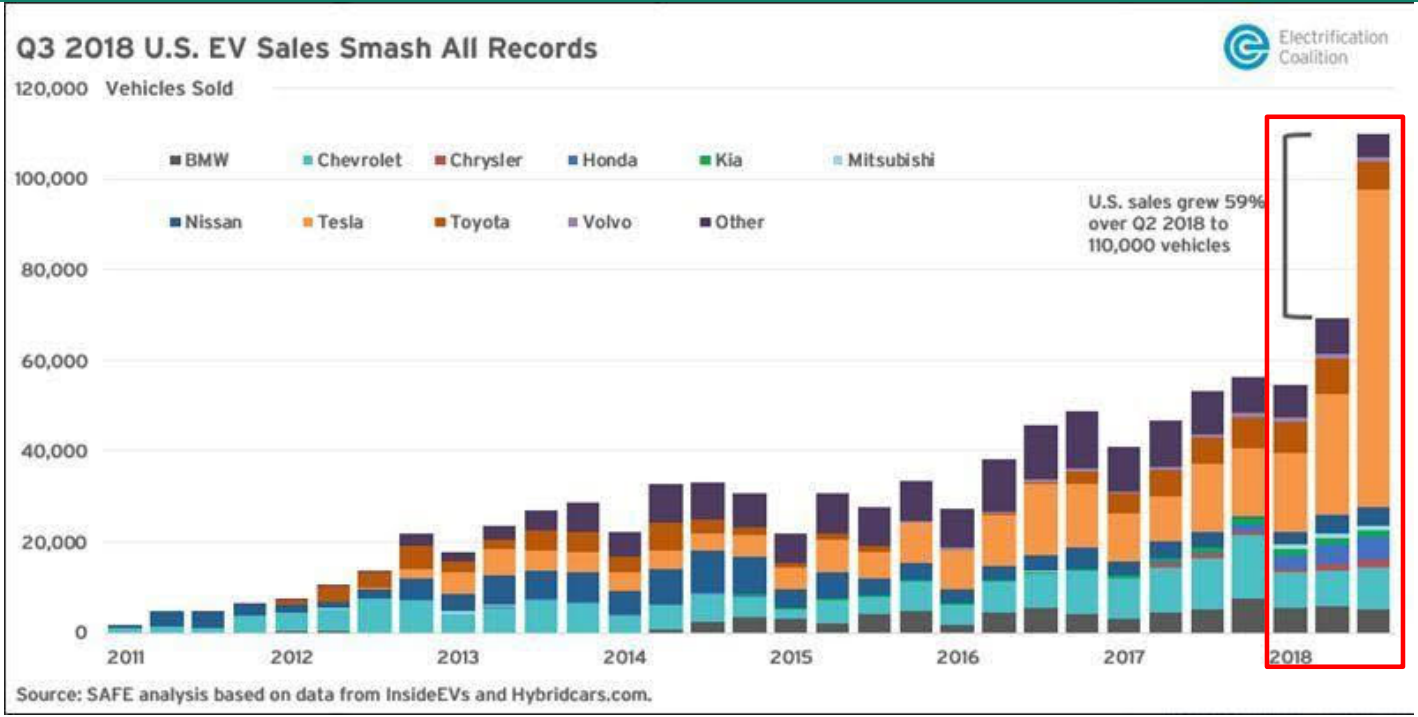
By taking a leadership role in the electrification of transportation, MCE will support its mission to reduce GHG emissions while maintaining the financial strength of the organization.

National Growth of EVs

MCE Service Area



Market Jump. Inflection?



Now until 2030?

Barriers to EV Adoption

1. **Too Expensive – 51%**
2. **Unable to charge away from home – 48%**
3. **Unable to charge at home – 30%**
4. Technology is not dependable – 28%
5. Not available in vehicle segment – 24%
6. Poor performance – 24%
7. Other – 17%

Source: The Barriers to Acceptance of Plug-in Electric Vehicles (NREL 2017)

EV Infrastructure Study

2022 EVSE Target - Scenario 1 - MCE Only	L1 + L2 Target	Gap by 2022	Annual EVSE Needed
Contra Costa	3,186	(2,901)	580
Marin	1,793	(1,640)	328
Napa	433	(290)	58
Solano	91	44	(9)
TOTAL	**5,503**	**(4,787)**	**957**

2022 EVSE Target - Scenario 2 - MCE Only	L1 + L2 Target	Gap by 2022	Annual EVSE Needed
Contra Costa	4,398	(4,113)	823
Marin	2,476	(2,323)	465
Napa	598	(455)	91
Solano	125	10	(2)
TOTAL	**7,598**	**(6,882)**	**1,376**

Current EV Supply Equipment (EVSE) installations and projected need.

Scenario1:

28% growth

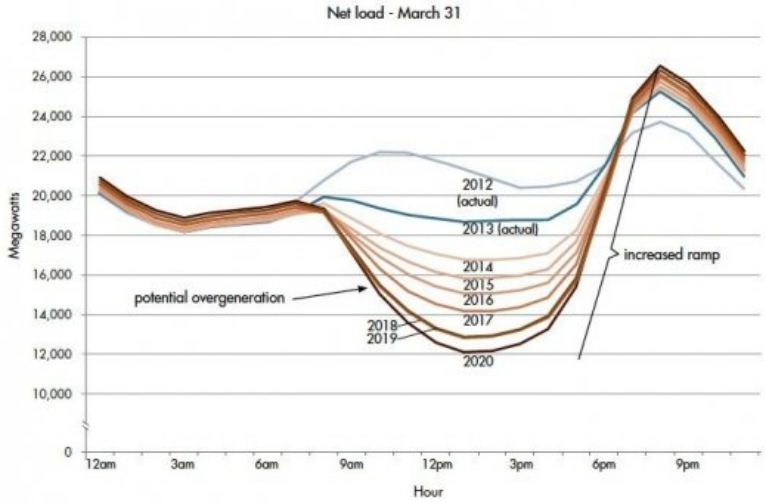
Scenario 2:

35% growth

Workplace Charging Spurs EV Adoption

According to an August 2014 Department of Energy survey, employees of companies that offer charging stations are 20 times more likely to drive an EV.

Workplace Charging Slims Duck Curve



Source: California Independent System Operator (CAISO)

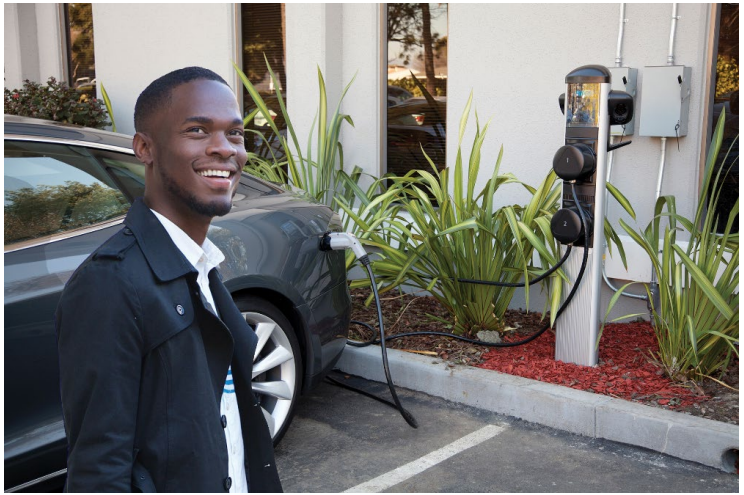
MCE's EV and Charging Programs

Goal: 540 ports (workplaces & MUDs) + 100 low-income EVs

1. Supplemental Rebate on PG&E's EV Charge Network Program

2. MCEv rebate + Technical Assistance for 2-20 port projects

3. Rebate for new or used EVs to expand access to low-income customers



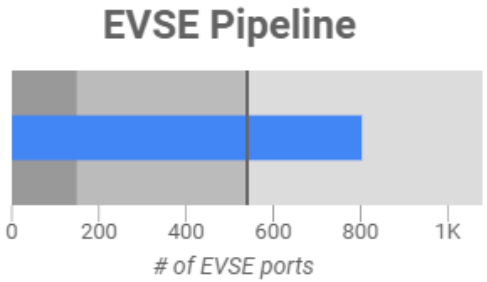
Progress to Date:

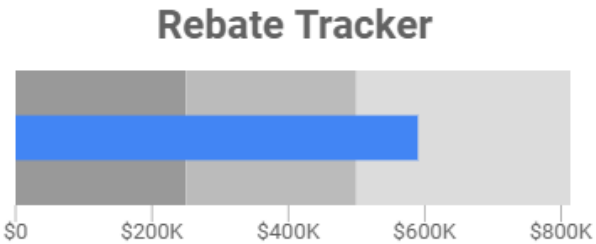
EV Charging Infrastructure

- ✓ Launched in late July
- ✓ 251 customers engaged (and many more informed)
- ✓ 419 ports (goal: 540)
- ✓ Excitement + hesitation

MCEv CHARGING PROGRAM

eV charge network





Key Stats:

- 3x more interest in MCEv
- 5th most popular webpage since launch
- Fairly even geographic spread across service area, although participation weighs more toward local govt & large biz

Progress to Date: Low-income EV Access

- ✓ Launched in late Sept & intaking customers
- ✓ Developing implementation partnership
- ✓ Exploring car sharing models to define access beyond ownership

FY18 Program Budget

Program Area	FY18	% Spent*	Likely % Spent by end of FY18
EV Charge Network Supplemental	$584,137	7%	84%
MCEv Charging	$275,000	7%	74%
MCEv Low Income Access	$385,000	0%	75%
Total	**$1,244,137**	**5%**	**79%**

Post FY18/19 Program Opportunities

- Evaluate & Refine Existing Offerings
- Extending non-MCE offers to our customers
- Marketing
- Customer Platform for EVs
- Regional Planning & Permitting
- Drive Deep Green & EV Rates

Thank You

Brett Wiley, Customer Programs Manager

AI #07: Update on MCE Transportation Electrification Program