



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, August 30, 2018**  
**8:30 A.M.**

**Charles F. McGlashan Board Room, 1125 Tamalpais Avenue, San Rafael, CA 94901**

**One Concord Center, 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 5.3.18 Meeting Minutes
6. MCE Greenhouse Gas Emissions Analysis (Discussion/Action)
7. MCE 2017 Annual Power Source Disclosure Report Attestation (Discussion/Action)
8. California Independent System Operator: Overview and Updates (Discussion)
9. Electricity Storage and MCE (Discussion)
10. Committee Member & Staff Matters (Discussion)
11. 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](mailto:djackson@mceCleanEnergy.org) not less than **four work days** in advance of the event.

**DRAFT**

**MCE  
TECHNICAL COMMITTEE MEETING  
May 3, 2018  
8:30 A.M.**

**The Barbara George Room**, 1125 Tamalpais Avenue, San Rafael, CA 94901  
**One Concord Center**, 2300 Clayton Road, Room 1150, Concord, CA 94520  
**The City of El Cerrito**, Hillside Conference Room, 10890 San Pablo Avenue, CA 94530  
**The 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 (**Concord**)  
Darlene Jackson, Board Clerk (**Concord**)  
Sam Kang, Resource Planning (**Concord**)  
J.R. Killigrew, Community Development Manager (**Concord**)  
David McNeil, Manager of Finance (**San Rafael**)  
Enyonam Senyo-Mensah, Operations Assistant (**Concord**)  
Lindsay Saxby, Power Supply Contracts Manager (**San Rafael**)  
CC Song, Senior Policy Analyst (**Concord**)  
Dawn Weisz, Chief Executive Officer (**Concord**)

The meeting was called to order at 8:35 A.M. by Committee Chair, Kate Sears.

**Action Taken:**

**Agenda Item #2 – Public Open Time**

Members of the public Doug Wilson, Marin Conservation League Board member, and Howdy Goudey, El Cerrito, had comments.

**Agenda Item #3 – Report from the Chief Executive Officer (Discussion)**

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

- New development – CPUC is issuing a “white paper” on customer choice that will be entitled the “Green Book.” A link where the “Green Book” can be reviewed will be provided to the Committee.

**DRAFT**

- A few CCAs will be launching in June 2018 (Valley Clean Energy, East Bay Clean Energy, Solana Beach and King City).

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

**Agenda Item #4 – 4.19.18 Meeting Minutes (Discussion/Action)**

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

**ACTION:** It was M/S/C (Withy/Haroff) to **approve 4.19.18 meeting minutes**. Motion carried by unanimous roll call vote. (Absent: Director Schroder).

**Agenda Item #5 – Proposed Power Purchase and Sale Agreement with Strauss Wind, LLC (Discussion/Action)**

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

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

**ACTION:** It was M/S/C (Haroff/Tatzin) to **authorize execution of Power Purchase and Sale Agreement with Strauss Wind, LLC for renewable energy supply**. Motion carried by unanimous roll call vote. (Absent: Director Schroder).

**Agenda Item #6 – MCE Greenhouse Gas Reporting and Power Supply Statistics (Discussion)**

Kirby Dusel, Resource Planning and Renewable Energy, presented this item and addressed questions from the Committee.

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

**ACTION:** No action required.

**Agenda Item #7 – Update on AB1110 Proceeding and Integrated Resource Plan Proceeding (Discussion)**

CC Song, Senior Policy Analyst, presented this item and addressed questions from the Board.

Committee Chair Kate Sears asked for public comment and there were comments from members of the public Doug Wilson, Pam Reaves and Howdy Goudey.

**ACTION:** No action required.

**DRAFT**

**Agenda Item #8 – MCE Electric Vehicle Program Update (Discussion)**

J.R. Killigrew, Community Development Manager, presented this item and addressed questions from the Committee.

Committee Chair, Kate Sears asked for public comment and there were comments from members of the public Pam Reaves and Howdy Goudey.

ACTION: No action required.

The meeting was adjourned at 11:05 A.M. to the next scheduled meeting on June 7, 2018.

---

Kate Sears, Committee Chair

**ATTEST:**

---

Dawn Weisz, Chief Executive Officer



August 30, 2018

TO: MCE Technical Committee

FROM: Dawn Weisz, Chief Executive Officer

RE: MCE Greenhouse Gas Emissions Analysis (Agenda #06)

ATTACHMENTS: A. Understanding MCE's GHG Emission Factors – Calendar Year 2016  
B. MCE 2016 Emission Factor Certification Template, as provided by The Climate Registry  
C. MCE 2017 Emission Factor Certification Template, as provided by The Climate Registry

Dear Board Members:

---

## **Background**

A key tenet of MCE's mission is to reduce energy-related greenhouse gas emissions (GHGs) through the development and use of various clean energy resources. MCE has committed to assembling a power supply portfolio that exceeds the renewable energy content offered by PG&E and provides customers with a "cleaner" energy alternative as measured by a comparison of the attributed portfolio GHG emission rate (or "emission factor") published by each organization.<sup>1</sup>

Each year staff prepares a document titled "Understanding MCE's GHG Emission Factors" (attached), which includes a detailed discussion focused on the compilation and calculation of MCE's annual emission factors, a comparison of MCE and PG&E emission factors, information regarding data sources, and pertinent regulatory/legislative developments focused on GHG emissions reporting. The Technical Committee of the Board is also asked to approve the attached Emission Factor Certification Template, which can be used by certain MCE customers, which also report emissions statistics to The Climate Registry.<sup>2</sup>

---

<sup>1</sup> To the extent that MCE undertakes inclusion activities (for new member communities) within a particular calendar year, achieving planned clean energy targets may be more challenging than usual due to inevitable uncertainties related to customer participation and actual energy use within new member communities – accurately predicting customer energy use during the first several months following account enrollment is particularly challenging, as participation rates tend to remain unstable while new customers gain familiarity with the CCA service model. MCE's growing commitment to renewable energy resources, many of which produce electric power on an intermittent basis, compound planning uncertainty and may contribute to variances relative to noted planning targets (for renewable and carbon-free energy delivery).

<sup>2</sup> MCE is a member of The Climate Registry ("TCR"), which is non-profit organization that designs and operates voluntary and compliance-based GHG reporting programs and assists organizations in measuring, verifying and reporting the carbon in their operations in order to manage and reduce it. Certain MCE customers also maintain TCR membership.

MCE's portfolio emissions for the 2016 calendar year totaled 268,728 metric tons or approximately 592 million pounds of carbon dioxide equivalent. These emission totals were divided by MCE's aggregate retail energy deliveries of 2,125,091 MWhs, resulting in an MCE portfolio emissions rate of 0.126 metric tons CO<sub>2</sub>e/MWh, or 279 pounds/MWh, for the 2016 calendar year. The following table provides additional detail regarding the emissions computations related to MCE's 2016 supply portfolio.

2016 Emission Calculation - MCE Total Portfolio (Light Green + Deep Green)	MWh Purchased	% Total	Total Emissions (metric tons)	Emissions Rate (metric tons CO <sub>2</sub> e/MWh)	Total Emissions (lbs)	Emissions Rate (lbs CO <sub>2</sub> e/MWh)
Total Renewable Energy (all RPS-Eligible)	1,198,664	56%	-	-	-	-
Zero Carbon	277,039	13%	-	-	-	-
Natural Gas	250,075	12%	97,822	0.391	215,659,512	862
System Power	399,313	19%	170,906	0.428	376,782,524	944
<i>Totals</i>	<i>2,125,091</i>	<i>100%</i>	<i>268,728</i>	<i>0.126</i>	<i>592,442,037</i>	<i>279</i>

Based on these calculations, it has been determined that MCE's 2016 aggregate portfolio emission factor (of 279 pounds/MWh) was approximately 5% lower than PG&E's reported 2016 emission factor of 294 pounds/MWh.<sup>3</sup>

**Fiscal Impact:** None

**Recommendations:** Discussion Only

---

For such customers, the reporting of annual GHG emissions related to electric energy use is facilitated with information included in the attached template.

<sup>3</sup> PG&E's final 2016 emission factor, as reported at <http://www.pgecurrents.com/2018/03/26/independent-registry-confirms-record-low-carbon-emissions-for-pge/>.

## Understanding MCE's GHG Emission Factors – Calendar Year 2016

### Summary

A key environmental metric for the MCE program continues to be the attributed greenhouse gas (GHG) emissions profile associated with retail electric energy deliveries to its customers. This paper describes the methodology used to calculate such GHG emission rates for the MCE program. Based on this methodology, the calendar year (CY) 2016 GHG emissions rates attributed to MCE's retail electric energy deliveries are as follows:

<b>Light Green Service (Minimum 50% Renewable):</b>	<b>286 lbs CO<sub>2</sub>e/MWh (CY 2015 = 331 lbs CO<sub>2</sub>e/MWh)</b>
<b>Deep Green Service (100% Renewable):</b>	<b>0 lbs CO<sub>2</sub>e/MWh (CY 2015 = 0 lbs CO<sub>2</sub>e/MWh)</b>
<b>Total MCE CY 2016 Portfolio:</b>	<b>279 lbs CO<sub>2</sub>e/MWh (CY 2015 = 323 lbs CO<sub>2</sub>e/MWh)</b>

### Background

A key tenet of MCE's mission is to reduce energy-related greenhouse gas emissions (GHGs) through the development and use of various clean energy resources. MCE has committed to assembling a power supply portfolio that exceeds the renewable energy content offered by PG&E and provides customers with a "cleaner" energy alternative as measured by a comparison of the attributed portfolio GHG emission rate (or "emission factor") published by each organization. MCE compares its emission factor to that of PG&E on an annual basis.

The period addressed in this emission factor comparison is the calendar year 2016 (CY 2016). The time lag in reporting comparative emissions statistics is necessary to facilitate the compilation of final electric energy statistics (e.g., customer energy use and renewable energy deliveries) and to allow sufficient time for data computation, review and audit before releasing such information to the public. For example, PG&E's CY 2016 emission factor was posted on March 26, 2018.<sup>1</sup> This is the most current available emission factor for PG&E. Going forward, the timeline associated with PG&E's emission factor availability is not expected to change significantly. MCE will complete an emissions rate comparison following PG&E's publication of its annual emissions statistic.

In each calendar year, MCE will endeavor to procure GHG-free energy supplies consistent with its Board-approved Integrated Resource Plan.<sup>2</sup> To the extent that MCE undertakes inclusion activities (for new member communities) within a particular calendar year, achieving planned clean energy targets may be more challenging than usual due to inevitable uncertainties related to customer participation and actual energy use within new member communities – accurately predicting customer energy use during the first several months following account enrollment is particularly challenging, as participation rates tend to remain unstable while new customers gain familiarity with the CCA service model. MCE's growing commitment to renewable energy resources, many of which produce electric power on an intermittent basis, compound planning uncertainty and may contribute to variances relative to noted planning targets (for renewable and carbon-free energy delivery).

With regard to MCE's comparative relationship with PG&E's reported GHG emissions factor, certain extenuating circumstances, such as higher than anticipated hydroelectric production or advanced completion of renewable generating facilities (which result in higher than expected renewable energy deliveries during a particular calendar

<sup>1</sup> <http://www.pgecurrents.com/2018/03/26/independent-registry-confirms-record-low-carbon-emissions-for-pge/>

<sup>2</sup> MCE will complete such purchases to the extent that such purchases are consistent with MCE's Board-approved Integrated Resource Plan and to the extent that the procurement of available GHG-free energy products would not necessitate out-of-cycle rate adjustments or impose material budgetary impacts. If such purchases are not consistent with MCE's Board-approved Integrated Resource Plan or if such purchases would result in adverse economic impacts to MCE's organization, staff will seek Board approval prior to engaging in related transactions.

year), as well as the ongoing implementation of other CCA programs through Northern California, cannot be predicted with precision and may contribute to unfavorable emissions comparisons between MCE and PG&E during limited periods of time. However, MCE's Integrated Resource Plan expresses an interest in procuring increasing proportions of clean energy over the upcoming ten-year planning horizon. In fact, MCE's internal planning targets establish a 100% GHG-free goal by 2025 as well as increased use of renewable energy fuel sources in achieving this objective.

### **About Emission Rates**

Portfolio emission rates are based on the attributed emission impacts associated with the use of specific fuel sources, which are consumed/combusted when generating electric power. An attributed emission rate reflects the proportionate use of various fuel sources and resource types within a utility's supply portfolio. To the extent that procured/delivered energy supplies are produced by generating resources that are known to emit GHGs during production of electric energy, such resources will increase the utility's attributed portfolio emission factor. Conversely, the inclusion of resources that do not emit GHGs (or emit relatively small GHG quantities during power production, as is the case with geothermal resources included within MCE's resource portfolio) will reduce the utility's portfolio emission factor. In general, renewable energy resources, which use fuel sources like wind and sunlight (solar), have been identified as non-polluting or GHG-free.<sup>3</sup> Similarly, hydroelectric and nuclear generators, which do not involve GHG-emitting combustion processes, are also considered to be non-polluting or carbon-neutral (i.e., the net emissions impact associated with electric power production is less than or equal to the status quo).

Because of widely varying opinions and computations focused on the environmental impacts associated with specific generating technologies, it is important to identify an industry-accepted or prescribed standard when determining the emission impacts attributable to generating facilities included within a utility's supply portfolio. Currently, there is no prescribed standard for retail-level GHG emissions reporting, but California has committed to developing such a standard through the implementation of Assembly Bill 1110 (AB 1110, Ting), which will impose a uniform retail-level GHG emissions reporting methodology, the results of which will be reflected in each retail seller's annual Power Content Label. Beginning with the 2019 operating year (with reporting to occur in 2020, following the conclusion of 2019 operations), California consumers will receive a modified Power Content Label, which will include an emissions factor associated with each available retail electricity option that was offered by the customer's service provider during the noted operating year. Specific details related to the AB 1110 emissions calculation methodology are currently under development (under guidance of the California Energy Commission, or "CEC"). MCE is actively participating in this process to promote consistency with existing best practices, and staff expect the CEC to release an updated staff proposal addressing AB 1110 implementation within the third quarter of 2018.

In the meantime and in the interest of consistency and accuracy during MCE's annual emissions calculations, it incorporates statistics prepared by the California Air Resources Board (CARB) and certain of its suppliers when determining emissions associated with its energy supply portfolio. In particular, CARB's published emission rate for unspecified sources, or "system power", provides an unbiased, publicly available reference that can be incorporated in instances where specific generating sources cannot be identified. Application of standards such as this will

---

<sup>3</sup> Certain fuel sources, including landfill gas, are reflected as having zero GHG emissions due to the positive environmental impacts achieved through the conversion of methane to carbon dioxide (during energy production). California's Emissions Performance Standard treats such generating resources in a similar manner. In fact, CPUC Decision 07-01-039 notes, "the record shows that electric generation using biomass (e.g., agricultural and wood waste, landfill gas) that would otherwise be disposed of under a variety of conventional methods (such as open burning, forest accumulation, landfills, composting) results in a substantial net reduction in GHG emissions". This Decision further indicates that, "trading off methane for CO2 emissions from energy recovery operations leads to a net reduction of the greenhouse effect".



facilitate an “apples to apples” comparison of emission factors associated with unknown energy sources, including those procured by MCE, PG&E and other electric utilities.

MCE also maintains membership with The Climate Registry (TCR), which provides access to the policies, procedures and GHG accounting guidelines endorsed by this organization. The TRC describes itself as:

*A non-profit organization governed by U.S. states and Canadian provinces and territories. TCR designs and operates voluntary and compliance GHG reporting programs globally, and assists organizations in measuring, verifying and reporting the carbon in their operations in order to manage and reduce it.*

Through its membership in TCR, MCE has access to information and documentation, which has contributed to the development of the emissions calculation methodology described herein. MCE has also incorporated guidance provided by the U.S. Environmental Protection Agency (U.S. EPA) and the Center for Resource Solutions (CRS, which administers the Green-e Energy program) when determining its attributed portfolio emission rates; other organizations have independently developed alternative methodologies, which borrow from multiple protocols, some of which may not be aligned with The Climate Registry, U.S. EPA and/or CRS. As one could reasonably suspect, certain differences between such methodologies have contributed to confusion and consternation during emission rate comparisons. Implementation of AB 1110 should serve to resolve such issues. Note that PG&E was a founding member of TCR, joining in 2008, and uses TCR’s methodology when compiling its annual emission statistics.

For certain MCE customers that are also members of TCR, MCE has prepared the attached Emission Factor Certification template, which can be used by such customers when completing voluntary reports for TCR. Looking ahead, MCE will continue to update (and post on its website) this certification template so that it can be readily accessed and used by MCE customers.

#### **Calculating GHG Emissions Associated with Unspecified Sources**

Not all electric energy purchases are associated with specific generating facilities. Many industry contracts identify the use of “system power”, a term of art that is regularly used in the utility industry to define electric energy that is produced and delivered to the grid by various generating resources not under contract with particular buyers. Such delivery arrangements provide increased flexibility for energy sellers which often results in reduced energy prices for buyers. While there are certain economic and operational efficiencies that may relate to the use of system power, there are also complications that can surface when attempting to quantify GHG emissions attributable to energy volumes associated with unspecified generating sources. Many load-serving entities (LSEs) within California rely heavily on the use of system power to fulfill their respective service obligations. PG&E’s 2016 Power Content Label indicated the delivery of 14% of total supply from unspecified, or market, sources; MCE sourced 19% of its retail deliveries from unspecified power. It is therefore important to identify an emission factor for such deliveries that can be referenced by LSEs when compiling emission statistics.

As previously noted, CARB has established an emission factor for unspecified generating sources to facilitate GHG calculations and reporting associated with the use of system power and power purchases from generation “portfolios”, which do not create direct relationships between specific electric generators and energy buyers. The CARB emission rate for unspecified power purchases is currently set at 0.428 metric tons CO<sub>2</sub>e/MWh, or 943.58 pounds of CO<sub>2</sub>e/MWh. This emission rate is publicly available and can be referenced in section 95111(b)(1) of CARB’s October 2017 update to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions: [https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2016-unofficial-2017-10-10.pdf?\\_ga=2.55979758.438689547.1531804429-1810449635.1517341042](https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2016-unofficial-2017-10-10.pdf?_ga=2.55979758.438689547.1531804429-1810449635.1517341042).

MCE staff previously engaged CARB in discussions and email exchanges to confirm the appropriate use of this emission rate for all unspecified/system power purchases; CARB advised MCE to use this published emission factor when determining GHG emissions associated with such purchases. Based on MCE's review, CARB has not recently updated the aforementioned emission factor, but staff will continue to monitor this item and will update its future emission factor calculations in consideration of any adjustments that may be made by CARB to this statistic.

Identification of a credible, publicly available system power emission factor is particularly relevant for MCE, which relies on the use of system power to meet some of its customers' non-renewable energy requirements. CARB's emission factor for unspecified sources has been applied by MCE when determining total emissions associated with system power purchases. It is also noteworthy that PG&E appears to have applied a similar factor when calculating emissions associated with unspecified generating sources.

#### **Determination of MCE's Total Portfolio Emission Factor**

For CY 2016, MCE's supply portfolio was heavily weighted towards non-carbon emitting/carbon-neutral resources. Over 69% of MCE's energy supply was attributable to various RPS-eligible renewable energy and hydroelectric purchases, which are considered to be very low- or non-GHG producing resources for purposes of MCE's emissions calculations. The following table summarizes MCE's aggregate energy purchases, which includes both Light Green and Deep Green sales volumes, for CY 2016. It is important to note that all "zero carbon" energy volumes are attributable to hydroelectric generating sources located within the Western U.S.

<b>2016</b>	<b>MWh Purchased</b>	<b>% Total</b>
<b>Total Renewable Energy<sup>1</sup></b>	1,198,664	56.4%
<b>RPS – Eligible Renewable</b>	1,198,664	56.4%
<b>Non-RPS Eligible Renewable</b>	0	0.0%
<b>Zero Carbon</b>	277,039	13.0%
<b>Natural Gas</b>	250,075	11.8%
<b>System Power</b>	399,313	18.8%
<b>Total</b>	2,125,091	100%

<sup>1</sup>Includes both bundled and unbundled renewable energy sources. Note that MCE's reported RPS percentage (as communicated to the CPUC in applicable reporting templates) may differ from this statistic due to Green-e Energy rules related to MCE's Deep Green product. However, all of MCE's renewable energy purchases during the 2016 calendar year were produced by RPS-eligible generators (meaning, generators that received RPS certification by the California Energy Commission, including associated RPS identification numbers for each facility).

When determining MCE's aggregate attributed portfolio emission factor, the aforementioned CARB emission rate for unspecified sources, which equals 0.428 metric tons CO<sub>2</sub>e/MWh, was applied to MCE's system power purchases – 399,313 MWh during the 2016 calendar year. MCE also procured 250,075 MWh from Calpine's Delta Energy Center, which emits approximately 0.391 metric tons of CO<sub>2</sub>/MWh. Due to the emission characteristics attributable to MCE's other power sources, all other energy volumes were attributed an average emission factor of zero. As such, MCE's portfolio emissions for the 2016 calendar year totaled 268,728 metric tons or approximately 592 million pounds of carbon dioxide equivalent. These emission totals were divided by MCE's aggregate retail energy deliveries of 2,125,091 MWhs, resulting in an MCE portfolio emissions rate of 0.126 metric tons CO<sub>2</sub>e/MWh, or 279 pounds/MWh, for CY 2016. The following table provides additional detail regarding these emissions computations for MCE's CY 2016 supply portfolio.

2016 Emission Calculation - MCE Total Portfolio (Light Green + Deep Green)	MWh Purchased	% Total	Total Emissions (metric tons)	Emissions Rate (metric tons CO <sub>2</sub> e/MWh)	Total Emissions (lbs)	Emissions Rate (lbs CO <sub>2</sub> e/MWh)
Total Renewable Energy (all RPS-Eligible)	1,198,664	56%	-	-	-	-
Zero Carbon	277,039	13%	-	-	-	-
Natural Gas	250,075	12%	97,822	0.391	215,659,512	862
System Power	399,313	19%	170,906	0.428	376,782,524	944
<i>Totals</i>	<i>2,125,091</i>	<i>100%</i>	<i>268,728</i>	<i>0.126</i>	<i>592,442,037</i>	<i>279</i>

Based on these calculations, it has been determined that MCE's CY 2016 aggregate portfolio emission factor (of 279 pounds/MWh) was approximately 5% lower than PG&E's reported 2016 emission factor of 294 pounds/MWh.<sup>4</sup> Note that MCE has elected to use CO<sub>2</sub>e, or carbon dioxide equivalent, when expressing the emissions intensity of its power supply portfolio to retail customers. The determination was made based on available statistics reflected in CARB's Mandatory Reporting Regulation, which express the emissions intensity of system power using the CO<sub>2</sub>e metric instead of CO<sub>2</sub>, which is more commonly used when expressing the emissions intensity associated with Natural Gas and Geothermal power sources. Because system power purchases represented 19% of MCE's total power mix in 2016, or 61% of MCE's carbon-emitting power mix, MCE has opted to report its emission factor as CO<sub>2</sub>e, which reflects the impacts of multiple greenhouse gasses, such as carbon dioxide, nitrous oxide and methane, in a single unit of measurement.

#### Determination of MCE's Light Green and Deep Green Emission Factors

While certain stakeholders may be interested in MCE's previously discussed aggregate emission factor, there is also an interest in clearly understanding the specific emission factors attributable to MCE's retail supply options, which were available during CY 2016: Light Green (minimum 50% renewable energy content) and Deep Green (100% renewable energy content). As such, MCE has calculated product-specific emission factors, which may be useful to certain customers who want to better understand the direct environmental impacts attributable to energy consumption within their respective households and/or businesses. It is important to note that any MCE customer may choose to "zero out" attributed energy-related emissions by voluntarily selecting the Green-e certified Deep Green 100% renewable energy option. For more information regarding Deep Green enrollment, customers are encouraged to visit: <http://www.mcecleanenergy.org/100-renewable/>.

**Light Green:** MCE diligently plans for and procures electricity to provide clean power supply for Light Green customers. During the 2016 calendar year, MCE delivered a total of 2,074,367 MWh to Light Green customers of which 1,147,940 MWh (55.34% of total) were supplied from California Renewables Portfolio Standard (RPS) eligible sources, such as landfill gas, small hydroelectric, solar and wind – these RPS-eligible renewable energy volumes were used to demonstrate compliance with California's RPS and were retired through the Western Renewable Energy Generation Information System (WREGIS) consistent with applicable regulatory guidelines. MCE also delivered 277,039 MWh (13.36% of total) from non-polluting hydroelectric generators. The aforementioned resources, which comprised 68.69% of MCE's Light Green supply portfolio, were all determined to be carbon-free, low-carbon or carbon-neutral based on specified fuel sources. The balance of Light Green resource requirements were supplied from specific natural gas generators and unspecified sources, or "system power". In the case of electricity produced via the combustion of natural gas, MCE procured a total of 250,075 MWh, or 12.06% of total supply, from Calpine's Delta Energy Center; such volumes were assigned a GHG emissions factor of 862.38 lbs. CO<sub>2</sub>/MWh, consistent with guidance provided by the generator owner/operator. For system power purchases, which totaled 399,313 MWh, or 19.25% of total Light Green purchases, the California Air Resources Board (CARB) has assigned an emission rate of

<sup>4</sup> PG&E's final CY 2016 emission factor, as reported at <http://www.pgecurrents.com/2018/03/26/independent-registry-confirms-record-low-carbon-emissions-for-pge/>.

943.58 lbs. CO<sub>2</sub>e/MWh – MCE applied this emission factor to all system power volumes when compiling its Light Green emissions statistic for 2016. This emission rate is publicly available via CARB's website. CARB previously advised MCE to use this published emission factor when determining GHG emissions associated with system power purchases. For purposes of determining MCE's Light Green emission factor for the 2016 calendar year, total portfolio emissions were determined to be approximately 592 million pounds. The total of 592 million pounds of CO<sub>2</sub> equivalent was divided by the total delivered Light Green electricity volume of 2,074,367 MWh, resulting in a 2016 Light Green emission factor of 286 lbs. CO<sub>2</sub>e/MWh.

**Deep Green:** Deep Green is a voluntary, 100% renewable energy supply option that is available to all customers within the MCE service territory. During the 2016 calendar year, MCE supplied a total of 50,724 MWh to Deep Green customers, all of which was supplied by RPS-eligible generators. However, due to Green-e Energy certification requirements, only 25% (the requisite RPS renewable energy procurement mandate during the 2016 calendar year) of the aforementioned Deep Green supply was retired and included within MCE's RPS compliance report (substantiating the delivery of an RPS-compliant resource mix to Deep Green customers); the balance of Deep Green supply was produced by RPS-eligible generators and was retired on behalf of participating customers consistent with Green-e Energy requirements – "Green-e is the nation's leading independent certification and verification program for renewable energy and greenhouse gas emission reductions in the retail market", which is administered/monitored by the San Francisco-based Center for Resource Solutions; all renewable energy volumes were retired through the WREGIS system.<sup>5</sup> As a result of the 100% renewable energy supply that was delivered to Deep Green customers, the emission factor was determined to be zero pounds of CO<sub>2</sub>e/MWh.

Consistent with its adopted Integrated Resource Plan, MCE does not engage in procurement transactions with nuclear generating facilities and, at this point in time, will rely exclusively on renewable energy resources and hydroelectricity to ensure delivery of a comparatively cleaner energy supply.<sup>6</sup>

As previously noted, MCE will continue to update subsequent annual emissions factors based on currently available data, including actual energy purchases and CARB's then-effective emission rate for unspecified sources. Any questions regarding this information should be forwarded to [info@mcecleanenergy.org](mailto:info@mcecleanenergy.org). Additional information regarding MCE's emission factors can be located at [www.mcecleanenergy.org](http://www.mcecleanenergy.org).

---

<sup>5</sup> Information as posted on the Green-e website: <http://www.green-e.org/about.shtml>.

<sup>6</sup> By comparison, PG&E's 2016 Power Content Label reflected the proportionate use of 24% nuclear-generated electricity.



### **MCE 2016 Emission Factor Certification Template, as provided by The Climate Registry:**

[Member] may use Marin Clean Energy's (MCE) 2016 emission factor in their voluntary greenhouse gas report submitted to The Climate Registry. Please note that during the 2016 calendar year MCE, the first operating Community Choice Aggregation program in California, offered two distinct retail supply options: 1) Light Green, which is the default retail supply option (MCE has committed to delivering Light Green customers a minimum 50% renewable energy supply); and 2) Deep Green, a voluntary retail supply option that procures 100% renewable energy for participating MCE customers.

With respect to the Light Green retail supply option, the 2016 emission factor attributed to this service option was determined to be 286 pounds of carbon dioxide equivalent per megawatt hour (lbs. CO<sub>2</sub>e/MWh<sup>1</sup>). For the Deep Green retail supply option, the 2016 emission factor attributed to this service option was determined to be zero lbs. CO<sub>2</sub>e/MWh, as a result of MCE delivering 100% renewable energy to participating customers. When considered in aggregate, the emission factor attributed to MCE's total portfolio, which reflects the procurement of resources sufficient to supply all MCE customers (both Light Green and Deep Green), was determined to be 279 lbs. CO<sub>2</sub>e/MWh for the 2016 calendar year – this statistic has been calculated for informational purposes only. In reporting to The Climate Registry, [Member] has selected the appropriate emissions factor corresponding with the retail supply option(s) under which [Member] received electric service during the 2016 calendar year.

MCE has calculated its 2016 emission factor of 286 lbs. CO<sub>2</sub>e/MWh for the Light Green product and zero lbs. CO<sub>2</sub>e/MWh for the Deep Green product based on the following independently developed methodology:

1. Light Green retail electricity product: MCE diligently plans for and procures electricity to provide clean power supply for Light Green customers. During the 2016 calendar year, MCE delivered a total of 2,074,367 MWh to Light Green customers of which 1,147,940 MWh (55.34% of total) were supplied from California Renewables Portfolio Standard (RPS) eligible sources, such as landfill gas, small hydroelectric, solar and wind – these RPS-eligible renewable energy volumes were used to demonstrate compliance with California's RPS and were retired through the Western Renewable Energy Generation Information System (WREGIS) consistent with applicable regulatory guidelines. MCE also delivered 277,039 MWh (13.36% of total) from non-polluting hydroelectric generators. The aforementioned resources, which comprised 68.69% of MCE's Light Green supply portfolio, were all determined to be carbon-free, low-carbon or carbon-neutral based on specified fuel sources. The balance of Light Green resource requirements were supplied from specific natural gas generators and unspecified sources, or "system power". In the case of electricity produced via the combustion of natural gas, MCE procured a total of

<sup>1</sup> Based on available emission factors for the carbon-emitting power sources included in MCE's 2016 supply portfolio, MCE has elected to use CO<sub>2</sub>e, or carbon dioxide equivalent, when expressing the emissions intensity of its power supply portfolio to retail customers. CARB's Mandatory Reporting Regulation expresses the emissions intensity of system power using the CO<sub>2</sub>e metric instead of CO<sub>2</sub>, which is more commonly used when expressing the emissions intensity associated with Natural Gas and Geothermal power sources. Because system power purchases represented 19% of MCE's total power mix in 2016, or 61% of MCE's carbon-emitting power mix, MCE has opted to report its emission factor as CO<sub>2</sub>e, which reflects the impacts of multiple greenhouse gasses, such as carbon dioxide, nitrous oxide and methane, in a single unit of measurement.

250,075 MWh, or 12.06% of total supply, from Calpine's Delta Energy Center; such volumes were assigned a GHG emissions factor of 862.38 lbs. CO<sub>2</sub>/MWh, consistent with guidance provided by the generator owner/operator. For system power purchases, which totaled 399,313 MWh, or 19.25% of total Light Green purchases, the California Air Resources Board (CARB) has assigned an emission rate of 943.58 lbs. CO<sub>2</sub>e/MWh – MCE applied this emission factor to all system power volumes when compiling its Light Green emissions statistic for 2016. This emission rate is publicly available via CARB's website. CARB previously advised MCE to use this published emission factor when determining GHG emissions associated with system power purchases. For purposes of determining MCE's Light Green emission factor for the 2016 calendar year, total portfolio emissions were determined to be approximately 592 million pounds. The total of 592 million pounds of CO<sub>2</sub> equivalent was divided by the total delivered Light Green electricity volume of 2,074,367 MWh, resulting in a 2016 Light Green emission factor of 286 lbs. CO<sub>2</sub>e/MWh.

2. Deep Green retail electricity product: MCE offers the Deep Green, 100% renewable energy retail supply option on a voluntary basis. During the 2016 calendar year, MCE supplied a total of 50,724 MWh to Deep Green customers, all of which was supplied by RPS-eligible generators; associated renewable energy certificates were retired through the WREGIS consistent with applicable regulatory guidelines and Green-e Energy certification guidelines (as MCE's Deep Green product continues to remain Green-e Energy certified). As a result of the 100% renewable energy supply that was delivered to Deep Green customers, the attributed emission factor was determined to be zero lbs. CO<sub>2</sub>e/MWh.

MCE's Total Attributed Portfolio Emission Factor (2016): to determine MCE's total attributed portfolio emission factor for the 2016 calendar year, which reflects the procurement of resources sufficient to supply both Light Green and Deep Green customers, MCE's total portfolio emissions of 592 million pounds of CO<sub>2</sub> was divided by total retail sales to all MCE customers (both Light Green and Deep Green), which equaled 2,125,091 MWhs.<sup>2</sup> The resultant attributed emission factor for MCE's total supply portfolio was determined to be 279 lbs. CO<sub>2</sub>e/MWh.

With respect to the noted renewable energy and hydroelectric purchases included within MCE's Light Green and Deep Green energy supply portfolios, MCE has retained all pertinent transaction records, including evidence of applicable renewable energy certificate retirements (within WREGIS), to substantiate its procurement activities and emission factor calculations. When determining the aforementioned attributed emission factors, MCE has only reflected the impacts of renewable and carbon-neutral/carbon-free resources for which it owns and possesses applicable renewable energy certificates and/or transaction records. All applicable renewable energy certificates are held in MCE's WREGIS account until such time that certain certificates must be "retired" to demonstrate mandatory and/or voluntary compliance.

Any questions regarding the previously noted emission factors and/or related calculations should be directed to the following point of contact:

Kirby Dusel  
kirby@pacificea.com  
MCE  
1125 Tamalpais Avenue  
San Rafael, California 94901  
1 (888) 632-3674

<sup>2</sup> The sum of MCE's Light Green and Deep Green energy sales may not equal total reported MCE retail sales due to numeric rounding.



**MCE 2017 Emission Factor Certification Template, as provided by The Climate Registry:**

[Member] may use Marin Clean Energy's (MCE) 2017 emission factor in their voluntary greenhouse gas report submitted to The Climate Registry. Please note that during the 2017 calendar year MCE, the first operating Community Choice Aggregation program in California, offered three distinct retail supply options: 1) Light Green, which is the default retail supply option (MCE has committed to delivering Light Green customers a minimum 50% renewable energy supply); 2) Deep Green, a voluntary retail supply option that procures 100% renewable energy for participating MCE customers; and 3) Local Sol, a voluntary retail supply options that sources 100% of participating customer energy requirements from photovoltaic solar generators located within MCE's service territory.

With respect to the Light Green retail supply option, the 2017 emission factor attributed to this offering was determined to be 114 pounds of carbon dioxide equivalent per megawatt hour (lbs. CO<sub>2</sub>e/MWh<sup>1</sup>). For the Deep Green and Local Sol retail supply options, the 2017 emission factor attributed to each service options was determined to be zero lbs. CO<sub>2</sub>e/MWh, as a result of MCE delivering 100% renewable energy to participating customers. When considered in aggregate, the emission factor attributed to MCE's total portfolio, which reflects the procurement of resources sufficient to supply all MCE customers (Light Green, Deep Green and Local Sol), was determined to be 109 lbs. CO<sub>2</sub>e/MWh for the 2017 calendar year – this statistic has been calculated for informational purposes only. In reporting to The Climate Registry, [Member] has selected the appropriate emissions factor corresponding with the retail supply option(s) under which [Member] received electric service during the 2017 calendar year.

MCE has calculated its 2017 emission factor of 114 lbs. CO<sub>2</sub>e/MWh for the Light Green product and zero lbs. CO<sub>2</sub>e/MWh for the Deep Green and Local Sol products based on the following independently developed methodology:

1. Light Green retail electricity product: MCE diligently plans for and procures electricity to provide clean power supply for Light Green customers. During the 2017 calendar year, MCE delivered a total of 2,697,310 MWh to Light Green customers of which 1,642,286 MWh (60.89% of total) were supplied from California Renewables Portfolio Standard (RPS) eligible sources, such as landfill gas, geothermal, small hydroelectric, solar and wind – these RPS-eligible renewable energy volumes were used to demonstrate compliance with California's RPS and were retired through the Western Renewable Energy Generation Information System (WREGIS) consistent with applicable regulatory guidelines. MCE also delivered 707,099 MWh (26.21% of total) from non-polluting hydroelectric generators. The aforementioned resources, which comprised 87.10% of MCE's Light Green supply portfolio, were all determined to be carbon-free, low-carbon or carbon-neutral based on specified fuel sources. An additional 31,804 MWh, or 1.18%, of the Light Green supply portfolio was provided by Asset Controlling Suppliers (ACS), which offer low-carbon supply from generating resources that rely heavily on hydroelectricity and renewable

<sup>1</sup> Based on available emission factors for the carbon-emitting power sources included in MCE's 2017 supply portfolio, MCE has elected to use CO<sub>2</sub>e, or carbon dioxide equivalent, when expressing the emissions intensity of its power supply portfolio to retail customers, which reflects the impacts of multiple greenhouse gasses, such as carbon dioxide, nitrous oxide and methane, in a single unit of measurement.

energy; ACS portfolios are assigned CARB-certified emission factors, which compare favorably to fossil-fuel resources. The balance of Light Green resource requirements were supplied from specific natural gas generators and unspecified sources, or "system power". In the case of electricity produced via the combustion of natural gas, MCE procured a total of 143,675 MWh, or 5.33% of total supply, from Calpine's Metcalf Energy Center; such volumes were assigned a GHG emissions factor of 863.00 lbs. CO<sub>2</sub>e/MWh, consistent with guidance provided by the generator owner/operator. For system power purchases, which totaled 172,445 MWh, or 6.39% of total Light Green purchases, the California Air Resources Board (CARB) has assigned an emission rate of 943.58 lbs. CO<sub>2</sub>e/MWh – MCE applied this emission factor to all system power volumes when compiling its Light Green emissions statistic for 2017. This emission rate is publicly available via CARB's website. CARB previously advised MCE to use this published emission factor when determining GHG emissions associated with system power purchases. For purposes of determining MCE's Light Green emission factor for the 2017 calendar year, total portfolio emissions were determined to be approximately 307 million pounds. The total of 307 million pounds of CO<sub>2</sub> equivalent was divided by the total delivered Light Green electricity volume of 2,697,310 MWh, resulting in a 2017 Light Green emission factor of 114 lbs. CO<sub>2</sub>e/MWh.

2. Deep Green retail electricity product: MCE offers the Deep Green, 100% renewable energy retail supply option on a voluntary basis. During the 2017 calendar year, MCE supplied a total of 106,616 MWh to Deep Green customers, all of which was supplied by RPS-eligible generators; associated renewable energy certificates were retired through WREGIS consistent with applicable regulatory guidelines and Green-e Energy certification guidelines (as MCE's Deep Green product continues to remain Green-e Energy certified). As a result of the 100% renewable energy supply that was delivered to Deep Green customers, the attributed emission factor was determined to be zero lbs. CO<sub>2</sub>e/MWh.

3. Local Sol retail electricity product: MCE's inaugural offering of the Local Sol service option occurred in 2017. This voluntary service option provided participating customers with 100% renewable energy produced by a photovoltaic solar generator located within MCE's service territory. During the 2017 calendar year, MCE supplied a total of 352 MWh to Local Sol customers, all of which was supplied by an RPS-eligible solar generator; associated renewable energy certificates were retired through WREGIS consistent with applicable regulatory guidelines and Green-e Energy certification guidelines (as MCE's Local Sol is a Green-e Energy certified energy product). As a result of the 100% renewable energy supply that was delivered to Local Sol customers, the attributed emission factor was determined to be zero lbs. CO<sub>2</sub>e/MWh.

MCE's Total Attributed Portfolio Emission Factor (2017): to determine MCE's total attributed portfolio emission factor for the 2017 calendar year, which reflects the procurement of resources sufficient to supply Light Green, Deep Green and Local Sol customers, MCE's total portfolio emissions of 307 million pounds of CO<sub>2</sub> was divided by total retail sales to all MCE customers (Light Green, Deep Green and Local Sol), which equaled 2,804,277 MWhs.<sup>2</sup> The resultant attributed emission factor for MCE's total supply portfolio was determined to be 109 lbs. CO<sub>2</sub>e/MWh.

With respect to the noted renewable energy and hydroelectric purchases included within MCE's Light Green, Deep Green and Local Sol energy supply portfolios, MCE has retained all pertinent transaction records, including evidence of applicable renewable energy certificate retirements (within WREGIS), to substantiate its procurement activities and emission factor calculations. When determining the aforementioned attributed emission factors, MCE has only reflected the impacts of renewable and carbon-neutral/carbon-free resources for which it owns and possesses applicable renewable energy certificates and/or transaction records. All applicable renewable energy certificates are held in MCE's

<sup>2</sup> The sum of MCE's Light Green, Deep Green and Local Sol energy sales may not equal total reported MCE retail sales due to numeric rounding.



WREGIS account until such time that certain certificates must be "retired" to demonstrate mandatory and/or voluntary compliance.

Any questions regarding the previously noted emission factors and/or related calculations should be directed to the following point of contact:

Kirby Dusel  
kirby@pacificea.com  
MCE  
1125 Tamalpais Avenue  
San Rafael, California 94901  
1 (888) 632-3674



August 30, 2018

TO: MCE Technical Committee

FROM: Kirby Dusel, Resource Planning & Renewable Energy Programs

RE: MCE 2017 Annual Power Source Disclosure Report Attestation  
(Agenda Item #07)

Dear Committee Members:

---

**SUMMARY:**

California Public Utilities Code requires all retail sellers of electric energy, including MCE, to disclose “accurate, reliable, and simple-to-understand information on the sources of energy” that are delivered to their respective customers.<sup>1</sup> Applicable regulations direct retail sellers to provide such communications to customers following each year of operation. The format for requisite communications is highly prescriptive, offering little flexibility to retail sellers when presenting such information to customers. This format has been termed the “Power Content Label” (or PCL) by the California Energy Commission (CEC). Prior to distributing the PCL to its customers, MCE annually submits a report regarding its specified power purchases to the CEC. This report is a required element of California’s Power Source Disclosure Program (PSD Program) and was timely submitted to the CEC prior to the June 1<sup>st</sup> reporting deadline. Both the aforementioned annual report and the PCL are required elements of California’s PSD Program, and information reflected in the annual report is contributory to the PCL (with the annual report’s power supply breakout being inserted in the PCL).

Information presented in the PCL includes the proportionate share of total energy supply attributable to various resource types, including both renewable and conventional fuel sources. In the event that a retail seller meets a certain percentage of its supply obligation from unspecified resources, the report must identify such purchases as “unspecified sources of power.” As your Committee is aware, a limited number of MCE’s supply agreements allow for the use of such unspecified purchases to satisfy a portion of MCE’s energy requirements – these purchases have been appropriately identified as

---

<sup>1</sup> California Public Utilities Code Section 398.1(b)

“unspecified sources of power” in the PCL. MCE’s Public Affairs team is in the process of designing the 2017 Power Content Label at this time.

During the 2017 calendar year, MCE successfully delivered a substantial portion of its electric energy supply from various renewable energy sources, including wind, solar, geothermal, hydroelectricity, biomass and biogas – for Light Green customers, the percentage of supply attributable to renewable energy sources approximated 61 percent; for Deep Green and Local Sol customers, renewable energy comprised 100 percent of the supply portfolio. A simplified representation of MCE’s 2017 PCL is presented below:

<b>POWER CONTENT LABEL</b>				
<b>ENERGY RESOURCES</b>	<b>2017</b>	<b>2017</b>	<b>2017</b>	<b>2017</b>
	<b>LIGHT GREEN</b>	<b>DEEP GREEN</b>	<b>LOCAL SOL</b>	<b>CA</b>
	<b>Power Mix</b>	<b>Power Mix</b>	<b>Power Mix</b>	<b>Power Mix</b>
<b>Eligible Renewable</b>	<b>61%</b>	<b>100%</b>	<b>100%</b>	<b>29%</b>
-- Biomass & waste	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%
<b>Coal</b>	0%	0%	0%	4%
<b>Large Hydroelectric</b>	26%	0%	0%	15%
<b>Natural Gas</b>	5%	0%	0%	34%
<b>Nuclear</b>	0%	0%	0%	9%
<b>Other</b>	1%	0%	0%	<1%
<b>Unspecified sources of power*</b>	<b>6%</b>	<b>0%</b>	<b>0%</b>	<b>9%</b>
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Consistent with applicable regulations, MCE will complete requisite customer communications following your Committee’s approval of pertinent information to be included in the 2017 PCL. Customers receiving PCL communications will include those enrolled in the MCE program as of December 31, 2017 – the distribution list was derived based on prior discussions with designated CEC staff.

While preparing MCE’s 2017 annual PSD report, staff performed a detailed review of all power purchases completed for the 2017 calendar year. This review included an inventory of all renewable energy transfers within MCE’s Western Renewable Energy Generation Information System (WREGIS) accounts, pertinent transaction records, and requisite independent audits for MCE’s voluntary Deep Green, 100% renewable energy program, and MCE’s voluntary Local Sol program, which also provides 100% renewable energy to participating customers.<sup>2</sup> Based on staff’s review of available data and findings of the independent auditor (related to the Deep Green and Local Sol product offerings), the information presented in the annual report was determined to be accurate. Again, such information will be reflected in MCE’s upcoming PCL for 2017 operations.

<sup>2</sup> MCE’s Deep Green and Local Sol retail service options are Green-e Energy certified products, conforming to guidelines established by the Center for Resource Solutions, the Green-e Energy program administrator. As part of this certification, MCE must successfully complete an annual independent audit of power sources, ensuring the delivery of qualifying renewable energy to participating Deep Green and Local Sol customers. Such audits were timely completed, noting “no exceptions” in related audit reports.

To fulfill its obligations under the PSD Program, MCE must also provide the CEC with an attestation of its Governing Board regarding the accuracy of information included in the PSD annual reports. As MCE's Technical Committee, you have received delegated authority from the Governing Board to provide such attestation; the CEC has confirmed that such delegated authority is acceptable, subject to pertinent documentation of the Governing's Board's direction in this regard. With regard to this internally administered attestation process, applicable regulations state<sup>3</sup>:

*A retail supplier that is a public agency providing electric services is not required to comply with the provisions of subdivision (b)(1) for one electric service product if the board of directors of the public agency approves at a public meeting the submission to the Energy Commission of an attestation of the veracity of the annual report. A report in accordance with subdivision (b)(1) shall be submitted for each additional electric service product it offers to its customers.*

Because MCE's Deep Green and Local Sol product offerings were independently audited (a process that was completed in June 2018 for the 2017 operating year), MCE is proceeding with self-certification of its annual report for the Light Green product offering, consistent with PSDP regulations. Evidence of such attestation (for Light Green) as well as the aforementioned audit report (for Deep Green and Local Sol) must be provided to the CEC by October 1<sup>st</sup>.

In consideration of the aforementioned internal review, independent audit and applicable regulations, staff requests that your Committee accept this determination and attest to the accuracy of information included in MCE's 2017 Power Source Disclosure reports. Related information regarding the proportionate use of various fuel sources will be reflected in MCE's 2017 PCL. Should your Committee endorse staff's recommendation, a copy of this staff report, related meeting minutes and a copy of MCE's 2017 Audit Report for the Deep Green and Local Sol product offerings will be forwarded to the CEC, thereby completing MCE's obligations under the PSD Program for the 2017 calendar year.

**Recommendation:** Based on staff's review, endorse the accuracy of information presented in MCE's 2017 Power Source Disclosure report for Light Green service and approve the use of statistics reflected in MCE's 2017 annual PSD reports for purposes of preparing MCE's 2017 Power Content Label.

---

<sup>3</sup> Note that Section (b)(1), as referenced in the excerpt from applicable PSD regulations, refers to the completion of annual independent audits.



# Overview of the California Independent System Operator

Technical Committee

August 30, 2018

# Creating the CAISO and CaPX

- AB1890 passes on 9/23/1996 creating the CAISO and CaPX – They go live on 4/1/1998
- Implementation of Restructuring, not deregulation
- Causing Markets to provide through bids and transactions
- Five Board of Governors appointed by the Governor of California

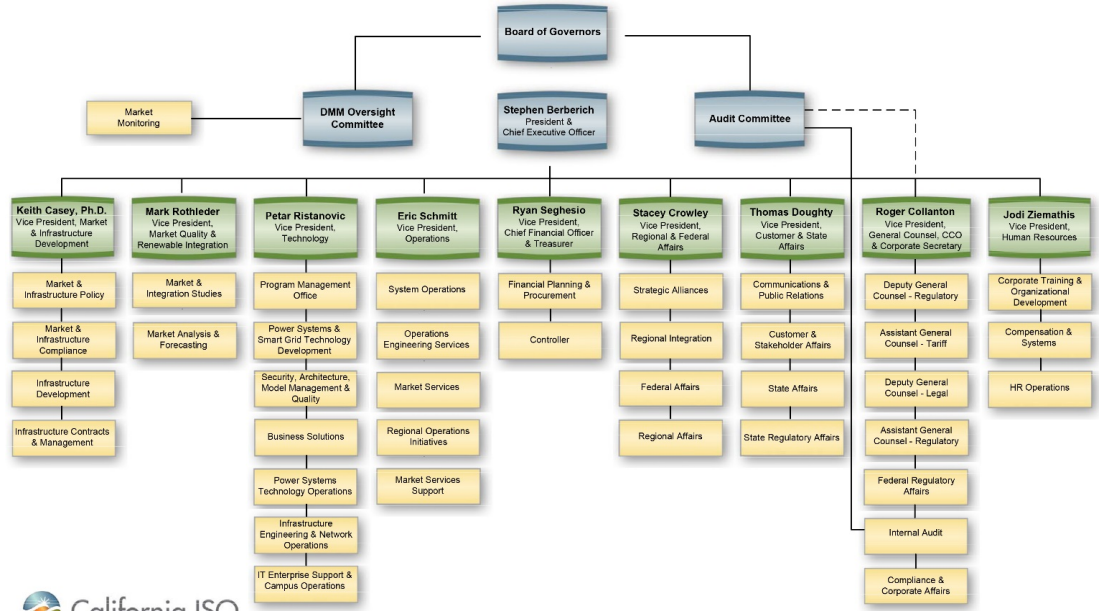
# Creating the CAISO and CaPX

(continued)

- Regulated by Federal Energy Regulatory Commission through an approved Tariff – Active with:
  - California Public Utilities Commission (CPUC)
  - California Energy Commission (CEC)
  - California Air Resources Board (CARB)
  - US Bureau of Reclamation (USBR)
- Scheduling Coordinators

AI #08: Overview of the CAISO

# CAISO Executive Structure



CAISO Public

At will employment with severance package.



# GMC and TAC

## Total Revenue Requirement for 2018 Grid Management Charge

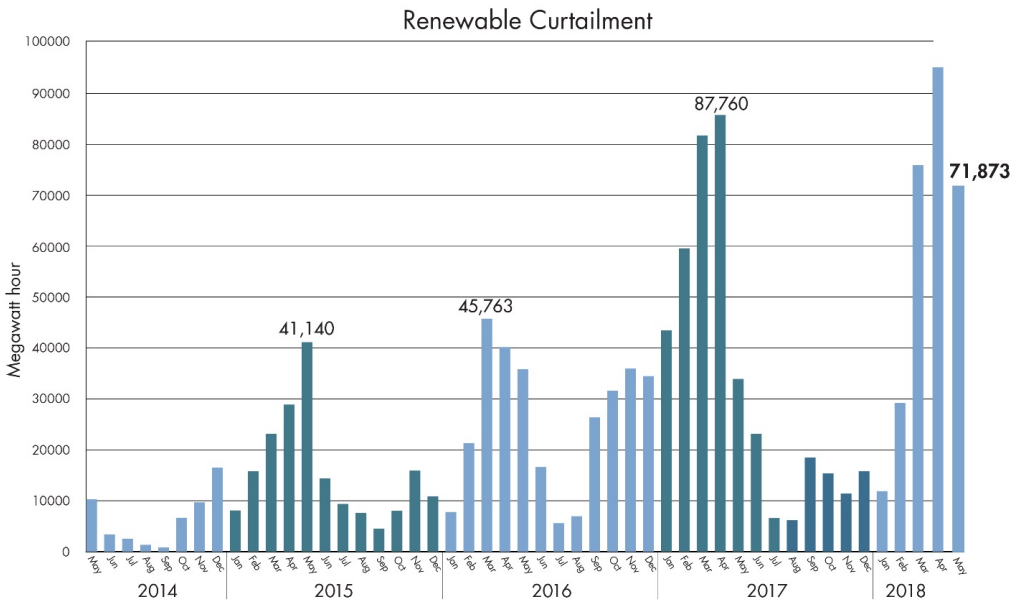
\$0.817/MWh at around 241 TWH = \$197M

## Transmission Access Charge Rate

of \$11.5744/MWh, on March 1, 2017

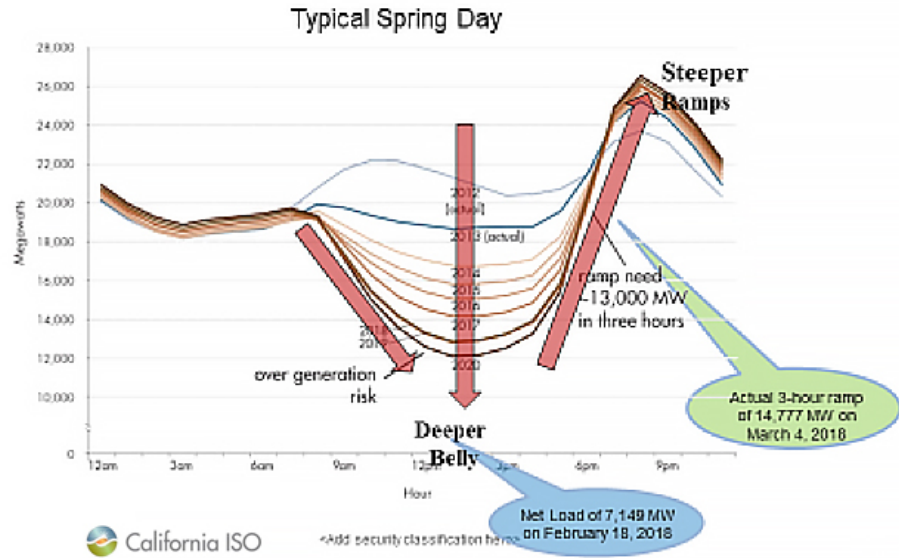
– Total approximate TAC amount for 2017 \$2.4B

# Historical Curtailments



# Deeper Duck Curve

Actual net-load and 3-hour ramps are about four years ahead of CAISO's original estimate



Thank You

Vicken Kasarjian, COO  
vkasarjian@mcecleanenergy.org





# Battery Storage

Technical Committee  
August 30, 2018

# Storage Types

- **Hydroelectric:** pump back
- **Compressed air:** in depleted wells or in containers
- **Flywheel:** delivering energy at rates beyond the ability of an energy source
- **Battery**

# Batteries in Our Lives

A battery's capability to charge and discharge in real-time, planned by time or price parameters makes it a crucial product for the elimination of GHG and electrification of our life.

Technological advancement in increased storage capability in smaller sizes, and reduction of mass and weight, will propel our society forward.

# Battery Capability

On the grid, a battery can provide:

- Resource Adequacy
- All the Ancillary Services including Regulation
- Voltage Control
- Frequency Control
- Black Start



# MCE Energy Storage

Pursuant to CPUC decision, MCE's obligation is around 11MW of aggregated storage installed by 2024.

Pursuant to CAISO, a battery should be able to last 4 hours.

$11\text{MW} \times 4 \text{ hours} = 44\text{MWh}$  of battery energy

# MCE Energy Storage

Staff is working on 2018 Open Season submittals as they look more economical than previous ones. We are considering projects between 0.5-20MW in size.

MCE is looking at additional partnering opportunities with our customers using the smaller size batteries.

Thank You

Vicken Kasarjian, COO  
[vkasarjian@mcecleanenergy.org](mailto:vkasarjian@mcecleanenergy.org)

