

Understanding MCE's GHG Emission Factors – Calendar Year 2014

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) 2014 GHG emissions rates attributed to MCE's retail electric energy deliveries are as follows:

Light Green Service (Minimum 50% Renewable):	334 lbs CO₂e/MWh (CY 2013 = 371 lbs CO₂e/MWh)
Deep Green Service (100% Renewable):	0 lbs CO₂e/MWh (CY 2013 = 0 lbs CO₂e/MWh)
Total MCE CY 2014 Portfolio:	324 lbs CO₂e/MWh (CY 2013 = 364 lbs CO₂e/MWh)

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 2014 ("CY2014"). The data reporting time lag 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 CY2014 emission factor was published in early February, 2016. 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 in sufficient quantities to ensure that MCE provides its customers with an electric energy supply that generates fewer attributed GHG emissions per megawatt hour than the incumbent utility.¹ MCE's future purchases of GHG-free energy supplies will be primarily based on its annual Integrated Resource Plan, reasonable projections of PG&E's emission rate, budgetary impacts and rate setting objectives. Projections of PG&E's emission rate will take into consideration planned increases in Renewables Portfolio Standard procurement obligations and other publicly available information regarding PG&E's anticipated procurement activities.

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.

¹ MCE will complete such purchases to the extent that available GHG-free energy products will not necessitate out-of-cycle rate adjustments or impose material budgetary impacts. If such consequences would result from the incremental procurement of GHG-free energy products, MCE will seek Board approval prior to engaging in related transactions.

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.² 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 standard when determining the emission impacts attributable to generating facilities included within a utility's supply portfolio. To avoid the potential for perpetual policy and accounting changes that could result from the use of ad hoc (and potentially inaccurate) emission calculations for certain generating resources, MCE incorporates statistics prepared by the California Air Resources Board (CARB) 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 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 is member of The Climate Registry ("TCR"). 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 the policies, procedures and GHG accounting guidelines endorsed by this organization and can incorporate such guidelines when determining its attributed portfolio emissions factors. 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 these 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.

It is also noteworthy that the topics of emission accounting, emission calculation methodologies, and attributed emission rates continue to be a focal point during discussions involving PG&E, the legislature, regulators and other stakeholders. At this point in time, there is not a single applicable methodology for determining GHG emission rates that must be followed within the electric utility industry. As previously noted, MCE has referenced protocols endorsed by The Climate Registry as well as 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

² 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).

have contributed to confusion and consternation during emission rate comparisons, and it is becoming increasingly apparent that a uniform methodology based on existing best practices may be helpful in alleviating such issues.

Robust discussion and debate regarding this subject continues to unfold, and the California Legislature (Assembly Bill 1110, Ting) is now focused on creating a uniform GHG emission calculation methodology, including related consumer disclosures as part of each retail electricity seller's annual Power Content Label reporting process. In practical terms, the proposed GHG emissions calculation methodology being considered in AB 1110 appears to be inconsistent with other industry-accepted calculation methodologies currently used within California and elsewhere in the United States. Discussions continue to occur between stakeholders and the author's office with the goal of reaching a clear and acceptable approach. MCE will continue to monitor this important process and will keep the Governing Board informed regarding substantive developments related to this proposed legislation.

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 2014 Power Content Label indicated the delivery of 21% of total supply from unspecified, or market, sources; MCE sourced 34% 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 CO₂e/MWh, or 943.58 pounds of CO₂e/MWh. This emission rate is publicly available and can be referenced in section 95111(b)(1) of CARB's February 2015 update to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions: <http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2014-unofficial-02042015.pdf>. 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 CY2014, MCE's supply portfolio was heavily weighted towards non-carbon emitting/carbon-neutral resources. Sixty-six percent of MCE's energy supply was attributable to various 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 CY2014. It is important to note that all "zero carbon" energy volumes are attributable to hydroelectric generating sources located within the Western U.S.

2014	MWh Purchased	% Total
Total Renewable Energy¹	717,631	57.2%
RPS – Eligible Renewable	717,631	57.2%
Non-RPS Eligible Renewable	0	0.0%
Zero Carbon	110,000	8.8%
System Power	427,163	34.0%
Total	1,254,794	100%

¹Includes 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 2014 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 CO₂e/MWh, was applied to MCE's system power purchases – 427,163 MWh during the 2014 calendar year. Due to the emission characteristics attributable to MCE's other power sources, all other energy volumes were attributed an average emission factor just above zero (5 pounds of CO₂e/MWh; this is based on the proportionate inclusion of geothermal electricity within MCE's resource mix, which has a small emissions impact approximating 70 pounds of CO₂e/MWh). As such, MCE's portfolio emissions for the 2014 calendar year totaled 184,454 metric tons or approximately 407 million pounds of carbon dioxide equivalent. These emission totals were divided by MCE's aggregate retail energy deliveries of 1,254,794 MWhs, resulting in an MCE portfolio emissions rate of 0.147 metric tons CO₂e/MWh, or 324 pounds/MWh, for the 2014 calendar year. The following table provides additional detail regarding these emissions computations for MCE's CY2014 supply portfolio.

2014 Calendar Year	MWh Purchased	% Total	Emission Rate (metric tons CO ₂ e/MWh)	Total Emissions (metric tons)	Emission Rate (lbs CO ₂ e/MWh)	Total Emissions (lbs)
Total Renewable Energy	717,631	57.2%	0.002	8,144	5	3,589,600
RPS – Eligible	717,631	57.2%	0.002	8,144	5	3,589,600
Non-RPS Eligible Renewable	0	0.0%	0.000	0	0	0
Zero Carbon	110,000	8.8%	0.000	0	0	0
System Power	427,163	34.0%	0.428	176,310	944	403,061,611
Totals	1,254,794	100%	0.147	184,454	324	406,651,211

Based on these calculations, it has been determined that MCE's CY2014 aggregate portfolio emission factor (of 324 pounds/MWh) was approximately 26% lower than PG&E's reported 2014 emission factor of 435 pounds/MWh.³

³ PG&E's final CY2014 emission factor, as reported at <http://www.pgecurrents.com/2016/02/05/pge%E2%80%99s-carbon-emissions-remain-among-nation%E2%80%99s-lowest/>.

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 CY2014: 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 and procures electricity to ensure the cleanest possible power supply for Light Green customers. During CY2014, MCE delivered a total of 1,219,294 MWh to Light Green customers of which 682,130 MWh (55.9% of total) were supplied from qualifying, California Renewables Portfolio Standard ("RPS") eligible sources, including biomass, 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 110,000 MWh (9.0% of total) from non-polluting hydroelectric generators. The aforementioned resources, which comprised 65.0% of MCE's total Light Green supply portfolio, were all determined to be carbon-free, low-carbon or carbon-neutral based on specified fuel sources.⁴ The balance of Light Green resource requirements were supplied from unspecified sources, or "system power." This CARB emission rate of 943.58 pounds of CO₂e/MWh was multiplied by total system power deliveries (427,163 MWh, or 35.0% of total), resulting in total Light Green portfolio emissions of approximately 406 million pounds of CO₂ equivalent. As this total represented the entirety of emissions associated with MCE's Light Green power supply portfolio, the amount of 406 million pounds of CO₂ equivalent was divided by the total delivered Light Green electricity volume of 1,219,294 MWh, resulting in a 2014 Light Green emission factor of 334 pounds of CO₂e/MWh.

Deep Green: A voluntary, 100% renewable energy supply option that is available to all customers within the MCE service territory. During CY2014, MCE supplied a total of 35,501 MWh to Deep Green customers, all of which was supplied by RPS-eligible generators. However, due to Green-e Energy certification requirements, only 21.7% (the requisite RPS renewable energy procurement mandate during the 2014 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.⁵ 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 CO₂e/MWh.

⁴ In 2014, MCE's Light Green supply portfolio included certain amounts of electricity produced by geothermal resources located with Calpine's Geysers facility. Such volumes were attributed a modest GHG emission factor of 70 pounds of carbon dioxide per MWh, consistent with previous guidance provided by Calpine.

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

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.⁶

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. Additional information regarding MCE's emission factors can be located at www.mcecleanenergy.org.

⁶ By comparison, PG&E's 2014 Power Content Label reflected the proportionate use of 21% nuclear-generated electricity.