



**Marin Clean Energy
Technical Committee Meeting
Monday, March 7, 2016
5:00 P.M.**

Kathrin Sears, Chair
County of Marin

Tom Butt, Vice Chair
City of Richmond

Bob McCaskill
City of Belvedere

Alan Schwartzman
City of Benicia

Sloan C. Bailey
Town of Corte Madera

Greg Lyman
City of El Cerrito

Barbara Coler
Town of Fairfax

Kevin Haroff
City of Larkspur

Sashi McEntee
City of Mill Valley

Brad Wagenknecht
County of Napa

Denise Athas
City of Novato

Carla Small
Town of Ross

Ford Greene
Town of San Anselmo

Genoveva Calloway
City of San Pablo

Andrew McCullough
City of San Rafael

Ray Withy
City of Sausalito

Emmett O'Donnell
Town of Tiburon

1125 Tamalpais Avenue
San Rafael, CA 94901

1 (888) 632-3674
mceCleanEnergy.org

**The Barbara George Conference Room
1125 Tamalpais Avenue, San Rafael, CA 94901**

Agenda Page 1 of 1

1. Board Announcements (Discussion)
2. Public Open Time (Discussion)
3. Report from Executive Officer (Discussion)
4. Approval of 1.11.16 Meeting Minutes (Discussion/Action)
5. Presentation by the Marin Carbon Project (Discussion)
6. Report on MCE 2014 Greenhouse Gas Emissions (Discussion)
7. Update on Buck Institute Solar Carport Installation (Discussion)
8. Scheduling Services Request for Offer Update (Discussion)
9. Confirmation Agreement for Carbon-free Electricity Supply (Discussion)
10. Board Member & Staff Matters (Discussion)
11. Adjourn



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**MARIN CLEAN ENERGY
TECHNICAL COMMITTEE MEETING
January 11, 2016
5:00 P.M.**

**The Barbara George Conference Room
1125 Tamalpais Avenue, San Rafael, CA 94901**

Roll Call

Present:

Ford Greene, Town of San Anselmo
Kevin Haroff, City of Larkspur
Greg Lyman, City of El Cerrito
Kate Sears, County of Marin, Chair
Carla Small, Town of Ross
Ray Withy, City of Sausalito

Absent:

Emmett O'Donnell, Town of Tiburon

Staff:

Greg Brehm, Director of Power Resources
Kirby Dusel, Resource Planning & Renewable Energy Programs,
Nick Shah, Power Supply Contract Manager
Jeremy Waen, Senior Regulatory Analyst
Dawn Weisz, Chief Executive Officer

Action taken:

Agenda Item #4 – Approval of Minutes from 10.5.15 Meeting (Discussion/Action)

M/s Withy/ Lyman (passed 6-0) approved minutes from 10.5.15 meeting. Director Small Abstained. Director O'Donnell was absent.

Kate Sears, Chair

ATTEST:

Dawn Weisz, Chief Executive Officer

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, and a charter objective of the agency, is to reduce energy-related greenhouse gas emissions (GHGs) through the development and use of various clean energy resources. As such, MCE has committed to assembling a power supply portfolio that not only exceeds the renewable energy content offered by the incumbent utility (PG&E) but also 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. This comparison will be performed on an annual basis in consideration of each utility's (MCE and PG&E) most recently published emission factor. Due to typical timelines affecting the availability of such information, the current comparison (focused on the 2014 calendar year) will generally reference PG&E data related to utility operations occurring 12 to 18 months prior to the current calendar year. This waiting period 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 2014 emission factor was recently 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, and MCE will complete an emission rate comparison following PG&E's publication of its annual emissions statistic. For purposes of this document, the aforementioned attributed emission factor comparison will focus on the 2014 calendar year.

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 and also, to a lesser extent, on reasonable projections of PG&E's emission rate, which will take into consideration planned increases in Renewables Portfolio Standard procurement obligations and other publicly available information regarding PG&E's anticipated procurement activities.

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.

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.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). 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.³

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 has also joined The Climate Registry, "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." Note that PG&E was also a founding member of TCR, joining in 2008. 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. Furthermore, for certain MCE customers that are also members of The Climate Registry, MCE has prepared the attached Emission Factor Certification template, which can be used by these customers when completing voluntary reporting efforts to The Climate Registry. 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

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).

³ Conversely (and according to its 2014 Power Content Label bill insert), PG&E's power mix included 21% nuclear generation.

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 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. Because many load-serving entities (LSEs) within California rely heavily on the use of system power to fulfill their respective service obligations (for example, 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 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 the 2014 calendar year, MCE's supply portfolio was heavily weighted towards non-carbon emitting/carbon-neutral resources. In fact, 66% 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 the 2014 calendar year. 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 2014 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 2014 aggregate portfolio emission factor (of 324 pounds/MWh) was approximately 34% lower than PG&E's reported 2014 emission factor of 435 pounds/MWh.⁴

⁴ PG&E's final 2014 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 the 2014 calendar year: 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 the 2014 calendar year, 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.⁵ 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 the 2014 calendar year, 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.⁶ 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.

⁵ 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.

⁶ Information as posted on the Green-e website: <http://www.green-e.org/about.shtml>.

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.

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

[March 17, 2016]

[Member] may use the Marin Clean Energy's (MCE) 2014 emission factor in their voluntary greenhouse gas report submitted to The Climate Registry. Please note that during the 2014 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 2014 emission factor attributed to this service option was determined to be 334 pounds of carbon dioxide equivalent per megawatt hour (lbs CO²e/MWh). For the Deep Green retail supply option, the 2014 emission factor attributed to this service option was determined to be zero lbs CO²e/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 324 lbs CO²e/MWh for the 2014 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 2014 calendar year.

MCE has calculated its 2014 emission factor of 334 lbs CO²e/MWh for the Light Green product and zero lbs CO²e/MWh for the Deep Green product based on the following independently developed methodology:

1. Light Green retail electricity product: Marin Clean Energy diligently plans and procures electricity to ensure the cleanest possible power supply for Light Green customers. During the 2014 calendar year, 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 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 Light Green supply portfolio, were all determined to be carbon-free, low-carbon¹ or carbon-neutral based on specified fuel sources. The balance of Light Green resource requirements were supplied from unspecified sources, or "system power", for which the California Air Resources Board (CARB) has assigned an emission rate of 0.428 metric tons CO²e/MWh, or 943.58 lbs 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

¹ In particular, MCE's 2014 Light Green resource mix included 51,280 MWh produced by geothermal generating resources located within Northern California. Such volumes were attributed a nominal emissions factor of 70 lbs CO²e/MWh, consistent with guidance provided by the generator operator.

unspecified/system power purchases; CARB advised MCE to use this published emission factor when determining GHG emissions associated with such purchases. For purposes of determining MCE's Light Green emission factor for the 2014 calendar year, the aforementioned CARB emission rate of 943.58 lbs CO²e/MWh was multiplied by total system power deliveries (427,163 MWh, or 35.0% of total), resulting in attributed Light Green portfolio emissions approximating 403 million pounds of CO² equivalent from system power deliveries. An additional 3.6 million pounds of CO² equivalent was attributed to MCE's Light Green supply portfolio in consideration of geothermal electricity procurement during the 2014 calendar year. In aggregate, MCE's Light Green power supply portfolio included attributed emissions totaling 407 million pounds of CO² equivalent. The total of 407 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 lbs CO²e/MWh.

2. Deep Green retail electricity product: Marin Clean Energy offers the Deep Green, 100% renewable energy retail supply option on a voluntary basis. During the 2014 calendar year, MCE supplied a total of 35,501 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 CO²e/MWh.

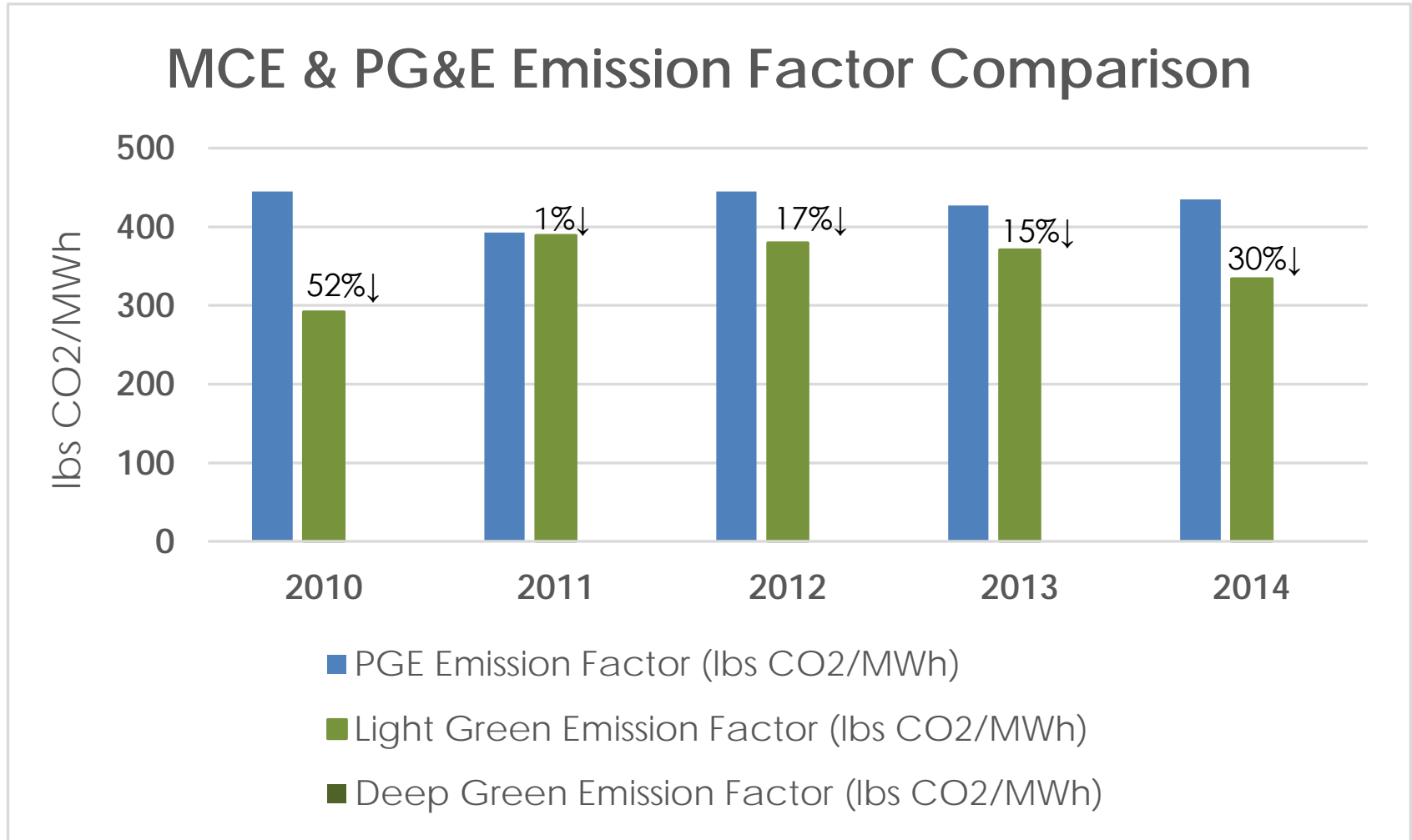
To determine MCE's total attributed portfolio emission factor for the 2014 calendar year, which reflects the procurement of resources sufficient to supply both Light Green and Deep Green customers, MCE's total portfolio emissions of 407 million pounds of CO² equivalent was divided by total retail sales to all MCE customers (both Light Green and Deep Green), which equaled 1,254,794 MWhs.² The resultant attributed emission factor for MCE's total supply portfolio was determined to be 324 lbs CO²e/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
Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, California 94901
1 (888) 632-3674

² 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 & PG&E Emission Factor Comparison





March 7, 2016

TO: Marin Clean Energy Board
FROM: Nick Shah, Power Contracts Manager
RE: Update on Scheduling Services Request for Offers (Agenda Item #08)
ATTACHMENT: Scheduling Services RFO Overview

Dear Board Members:

Overview:

MCE issued a Request for Offers for Scheduling Services ("RFO") to solicit offers for scheduling services in anticipation of the expiration of its existing scheduling services agreement(s) with Shell Energy North America (SENA). MCE's current generation Scheduling Coordination ("SC") agreement is set to expire in September 2016 and MCE's load SC agreement is set to expire in December 2017. In order to evaluate MCE's options for seeking the best fit of services for its portfolio, MCE is seeking offers for the following services:

1. **Generation SC Services:** this includes scheduling for power generation resources on a day-ahead, hour-ahead and real-time basis as required and providing monthly reporting and access to California Independent Operator (CAISO) settlements statements, database hosting, shadow settlement and invoice validation. For example, these services will help MCE continue to optimally schedule its renewable & conventional power procurement into the CAISO market, track and analyze costs, and ensure contract compliance.
2. **Load SC Services:** this includes scheduling of MCE forecast load on a day-ahead, hour-ahead and real-time basis as required. These services will help MCE continue to optimally schedule MCE's customer demand into the CAISO market and minimize imbalance energy exposure.
3. **Load Forecasting Services:** this includes forecasting for load on a week-ahead, day-ahead, hour-ahead and real-time basis. MCE seeks to integrate more real-time meter data, to help MCE continue to produce accurate forecasts of customer demand.
4. **Portfolio Management Services:** this includes recommending strategies for short term portfolio optimization and risk mitigation, within the parameters of MCE's risk mitigation practices, manage Congestion Revenue Rights (CRR) bids and CRR portfolio to mitigate congestion costs. These services will help MCE continue to help mitigate market risks and optimize market revenues.

The above descriptions provide a brief summary of each service category. For more details and key requirements, please refer to the attached RFO Overview document (Attachment).

RFO Timeline:

A timeline of the RFO process is included below:

MCE RFO for Energy Scheduling, Forecasting and Portfolio Management Services Selection Process	
Schedule of Requirements	Target Dates and Deadlines (by 5 PM PST)
Issue RFO	1/21/2016
Statement of Qualifications due to MCE	2/3/2016
Indicative Pricing due to MCE	2/11/2016
MCE to invite Qualified Respondents for Interview	2/16/2016
Interviews	2/23/2016- 3/2/2016
Clarifying Questions from Respondent Due to MCE	2/26/2016
Responses to Clarifying Questions posted by MCE	3/2/2016
Final Offers due from Respondent	3/9/2016

RFO Update:

On 1/21/2016, MCE issued the Scheduling Services RFO. The initial stage of the RFO required interested respondents to submit Statements of Qualification (“SOQ”). Due to the high level of interest, MCE further required interested respondents to provide indicative pricing. On 2/11/2016, MCE received SOQs and indicative pricing from sixteen respondents. Based on SOQs, indicative pricing and fulfillment of key requirements outlined in the RFO, MCE shortlisted six offers and initiated an interview process with qualified respondents. MCE will receive final offers from qualified respondents on 3/9/2016. The shortlist includes the following respondents:

1. *CES and 3 Phases*
2. *Ascend Analytics/APN/APX*
3. *Z Global Power Engineering & Energy Solutions*
4. *Tenaska Power Services Co.*
5. *Northern California Power Agency*
6. *The Energy Authority*

Evaluation of Responses:

MCE plans to select the best fit, least cost offer to meet the scheduling, forecasting, settlements and portfolio analysis requirements of MCE’s generation and load portfolio. In addition to services MCE currently receives from SENA, MCE is seeking additional/enhanced services, including but not limited to:

- Enhanced customer access to market data via user-friendly dashboards for more robust portfolio analysis
- Support/ provide invoice validation, seeking to add “Shadow settlement” services
- Hosted database & power portfolio analysis software
- Optimization of CRR portfolio, both physical and financial
- Recommend strategies for short term portfolio optimization and risk mitigation, within MCE parameters, guidelines and authorities

- Management of generation contracts and related costs independent of scheduling services and power marketing
- Improved load forecasting and imbalance energy exposure

Key Criteria in Evaluation of Responses:

- Local firm
- Industry experience and financial capacity
- Data access & analytics
- Services independent of power marketing
- Not-for-profit and/or resource independent
- Certified CAISO SC
- Financial strength

Expected Budget Impact:

For FY 2016/17, based on current indicative pricing and fulfillment of generation SC services starting September 2016, MCE staff estimate the budget impact to be \$90,000. Projected costs are accounted for in the proposed FY2016/17 budget.

Recommendation: Discussion item only.



MARIN CLEAN ENERGY

Request for Offers for Scheduling Coordination, Load Forecasting and Portfolio Management Services

RFO Date: 1/21/2016

Response Deadline: 3/9/2016

Marin Clean Energy (MCE) is soliciting competitive offers for scheduling coordination and related power portfolio services.

Introduction

Marin Clean Energy (MCE) is California's first operational Community Choice Aggregator and began serving customers in May of 2010 with the goal of reducing the greenhouse gas emissions of the local member communities it serves by delivering, more renewable energy to customers.

MCE provides retail electric generation services to approximately 175,000 customers within its service area, which comprises the political boundaries of Marin County, unincorporated Napa County, the cities of Richmond, San Pablo and El Cerrito (in Contra Costa County) and the City of Benicia (located in Solano County). MCE is organized as a Joint Powers Authority governed by a Board of Directors, made up of representatives from each of the local communities MCE serves. Participating retail customers continue to receive transmission and distribution services from PG&E and receive one bill from PG&E for both MCE generation and PG&E services.

Once a community joins MCE, MCE becomes the default generation provider for that community. MCE currently provides service to nearly eight out of ten electricity customers within its member communities and is the default electric generation provider for any new or relocated customers therein. MCE strives to provide electric power generation to its customers at stable and competitive rates, utilizing the cleanest possible sources of electricity. By 2025, MCE expects to deliver 80% renewable energy and 95% GHG free energy.

Background and Overlap of Services to facilitate transition

MCE is seeking offers from qualified providers for services related to load and generation scheduling, load forecasting and portfolio management in order to optimally manage its generation and load. MCE currently receives Scheduling Coordinator service for its contracted generation through Shell Energy North America, SENA under an existing agreement through September 6, 2016. SENA also schedules MCE load under a

separate agreement that continues through December 31, 2017. MCE anticipates the scope of scheduling services provided by the selected respondent(s) will begin with provision of Scheduling Coordination services for MCE's generation resources (Generation Scheduling Coordination Services) and may expand to incorporate a broader set of Scheduling Coordination services as set forth below.

In order to ensure continuity of service, MCE anticipates a 90 day service overlap period commencing on June 1, 2016) in order to transition from the existing Generation Scheduling Coordinator to the selected respondent for generation Scheduling Coordination Services with a 90 day service overlap period for Load Scheduling Coordinator Services commencing on October 1, 2017. MCE will work with the selected respondent(s) on further defining the transition requirements.

MCE's portfolio currently consists of more than 40 active power contracts serving an annual customer load of approximately 1,800 GWh, with deliveries made to the NP15 Trading Hub and in limited cases, the generator's pnode within the CAISO. MCE currently contracts with 4 renewable resources that participate in the CAISO Variable Energy Resource (VER) program; 2 additional resources will participate in VER upon reaching commercial operation in late 2016. For more information on MCE's energy portfolio, please review our 2015 Integrated Resources Plan at <http://mcecleanenergy.org/wp-content/uploads/MCE-2015-Integrated-Resource-Plan.pdf>.

Areas of Interest

The selected Respondent(s) will perform one or more of the following services:

- 1. Generation Scheduling Coordinator Services:** Shall perform scheduling for power generation resources on a day-ahead/hour-ahead/real-time basis as required and CAISO Demand Response bids. Resource Adequacy scheduling on year-ahead and T-45 month-ahead basis as required. Perform Variable Energy Resource (VER) program scheduling and VER performance monitoring. Perform power generation and resource adequacy invoice validations, including shadow settlement calculations of CAISO charges, and matching and validating inter SC-Trades. Submit disputes regarding Generation and CAISO charges and participate in the dispute resolution process; Provide monthly reporting and access to CAISO Statements, OASIS and CRR systems to allow monitoring of transactions, schedules, and settlements.
- 2. Load Forecast Services:** Shall perform forecasting for load on a week-ahead/day-ahead/hour-ahead/real-time basis as required. Provide accurate Real Time, Hour ahead, Day ahead, Week ahead, and Month ahead a load forecasts.
- 3. Load Scheduling Coordinator Services:** Shall perform scheduling of MCE forecast load on a day-ahead/hour-ahead/real-time basis as required based upon Load Forecasts provided or as adjusted. Manage and validate relevant CAISO statements for load settlements.
- 4. Portfolio Management services:** Monitor market conditions, including monthly and hourly load and resource balance. Recommend strategies for portfolio optimization and risk mitigation; actively manage net short and net long positions in accordance with agreed upon protocols. Manage Congestion Revenue Rights (CRR) bids and CRR portfolio to mitigate congestion costs.

Requirements

1. Requirements common to both Load and Generation Scheduling Coordinator Services:

- a. Shall perform CAISO/WECC Scheduling¹
 - i. 5-day per week day-ahead pre-scheduling services
 - ii. 7 day, 24 hour real-time services
 - iii. Non-Business Day real-time services
- b. The Scheduling Coordinator is expected to demonstrate all skills, knowledge and ability necessary to perform as Scheduling Coordinator including any applicable certifications or licenses associated with the Scheduling Services or required by the CAISO, NERC or WECC. The Scheduling Coordinator is responsible for emergency operational actions as may be needed. The Scheduling Coordinator must be listed on the CAISO Scheduling Coordinator list.
- c. Shall perform bidding or self-scheduling into appropriate markets. The Scheduling Coordinator is expected to implement and apply on a daily and hourly basis the selected bidding strategies approved by MCE to assure that generation and ancillary offers and load bids are submitted accurately and timely.
 - i. Scheduling. Scheduling Coordinator shall submit to the CAISO schedules and/or bids consistent with the CAISO's timelines as prescribed in the applicable tariffs and business practice manuals.
 - ii. Final Schedules. Scheduling Coordinator shall provide final confirmed day-ahead pre- schedules by CAISO deadlines.
- d. Shall perform all services in a professional manner consistent with Good Industry Practices and Applicable Laws and the CAISO Tariff.
- e. Shall be responsible for submitting data to appropriate Balancing Authorities to satisfy planning requirements.
- f. Shall be responsible for all schedule matching, tagging and checkout of schedules consistent with pertinent timelines.
- g. Perform CAISO invoice validations including inter SC-Trades and Generation against CAISO statements and provide access to an FTP site for MCE staff to download CAISO statements and OASIS Real Time LMP data for a minimum of 90 days after the trade date.
- h. Validate the scheduled against actuals and recommend forecast adjustments in order to mitigate energy/load imbalance charges.

2. Sub-requirements specifically for Generation Scheduling Coordinator Services:

- a. Shall provide the CAISO and/or Transmission Owners/Operators with all required notices and updates regarding generation facilities as required by applicable procedures, requirements and standards. Provide generators access to Outage Management System (OMS).
- b. Shall coordinate with generators and the CAISO to establish Net Qualifying Capacity (NQC) for generation resources and facilitate timely completion of all milestones of new resource implementation.
- c. Two Day Ahead pre-scheduling responsibilities include:

¹ MCE currently does not import energy into the CAISO, however, the Respondent shall specify any concerns related to scheduling WECC (non-CAISO) energy into a California Balancing Authority.

Perform pre-scheduling functions to the Western Area Power Administration (WAPA) Sierra Nevada Region in order to maximize hydropower value and minimize costs for MCE. Day Ahead Scheduling and Resource Management responsibilities include: Perform pre-scheduling functions, daily energy scheduling and trading, participation in Western's Base Resource Displacement program, and submitting schedules to CAISO (including managing Variable Energy Resource program requirements for MCE).

- d. Hour-ahead and Real Time Scheduling and Resource Management responsibilities include:
 - i. Maximize revenue of excess imbalance energy because of estimated load forecast errors or as market conditions warrant under established guidelines.
 - ii. Optimize use limited resources on a daily and hourly basis under agreed upon protocols.
 - iii. Monitor generation utilizing meter data on a constant 24/7 basis.
 - iv. Monitor Real-time LMPs, manage curtailments or generation adjustments based on agreed upon protocols to avoid negative LMPs.
 - v. Monitor uninstructed and instructed energy imbalances and report to MCE monthly on financial impacts and recommend mitigation strategies.
- e. Perform Energy Accounting (based on contracts/meter data), including CAISO Settlements

3. Sub-requirements specifically for Load Scheduling Coordinator Services:

- a. Shall submit load schedules into CAISO systems as updated load forecasts are provided (includes submission of hour ahead forecasts and any necessary intra-hour adjustments to load forecast into SIBR).
- b. Shall submit resource adequacy plans in accordance with CAISO Tariff and reliability services protocols.
- c. Monitor PG&E substation and/or CAISO SCADA systems for MCE load on a constant 24/7 basis.

4. Requirements Specific to Load Forecast Services:

- a. Shall perform forecasting and provide accurate Real Time, Hour ahead, Day ahead, Week ahead, and Month ahead load forecasts.
- b. Shall forecast and adjust load requirement hourly in accordance with agreed upon methodology.
- c. Shall provide daily and weekly forecast reconciliation report comparing forecast to actual electricity usage and update forecast models as needed to reduce forecast error.

5. Requirements for Portfolio Management services²:

- a. Portfolio optimization and risk mitigation, identify market opportunities and risks.
- b. Monitor and analyze supply and demand contract requirements and make recommendations to MCE staff regarding strategies for maximizing the benefits of these contracts.
- c. Actively manage Net short and Net Long positions subject to agreed upon protocols.
- d. Submit Congestion Revenue Rights (CRR) bids and provide quarterly CRR effectiveness report.

² MCE is currently drafting risk policies to be reviewed by respondent during negotiations. Such risk policies will set forth the parameters within which MCE's portfolio will be managed.

Offer Submission Required Elements

1. **Applicant Information:** Please complete the “Respondent Information” tab of the Scheduling Services Offer Form and submit to MCE by the requested deadline.
2. **Offer:** Please complete the relevant product tabs of the Scheduling Services Offer Form and submit to MCE by the requested submittal date. Please elaborate, as needed, and provide an itemized description of the services proposed an/or excluded, how the offer meets each of the objectives of this request for offers, a detailed description addressing all of the Areas of Interest, as well as any tasks, task elements and/or functions that are not part of the offer. Please include a summary of all exceptions to the request for offer requirements, scope of work, specifications, and reference to any proposed contractual terms and conditions required by the Respondent. *In order to select the best fit service provider to meet MCE’s portfolio needs, MCE is seeking independent offers for each of the four areas of interests. Optional: The respondent may also provide a combined services offer to reflect any benefit of combining multiple services.*
3. **Fees and Term of Services:** Pricing should be based on the requirements defined in this request for offers and should be itemized where relevant. For Scheduling Coordinator Services, MCE prefers the offer to include fulfillment of CAISO Scheduling Coordinator collateral posting requirements. Please state the proposed term of services agreement in the Offer Form. Include details of all offered pricing structures whether fixed fee or volumetric in nature.
4. **Statement of Qualifications and References:** Respondent must supplement their application with the following required information.
 - a. Describe your firm's experience as may be applicable to this request for offers, your organizational structure, key staff qualifications, and other contract related qualifications, including number of years firm has been in business directly related to the services being offered in this RFO.
 - b. State whether Respondent will use subcontractors to perform any portion of services pursuant to the contract. Should the use of subcontractors be offered, the Respondent shall provide the same Statement of Qualifications and assurances of competence for the subcontractor, plus the demonstrated ability to manage and supervise the subcontracted work. Subcontractors shall not be allowed to further subcontract with others for work. The provisions of any contract resulting from this RFO shall apply to all subcontractors in the same manner as to the Respondent.
 - c. Identify expectations of MCE including requirements definition, strategy refinement, and staffing requirements to support implementation methodology.
5. **RFO Timeline:** The RFO will be administered based on the following schedule list below. Please submit all questions, documents and offers to procurement@mcecleanenergy.org.

MCE RFO for Energy Scheduling, Forecasting and Portfolio Management Services Selection Process	
Schedule of Requirements	Target Dates and Deadlines (by 5 PM PST)
Issue RFO	1/21/2016
Statement of Qualifications due to MCE	2/3/2016

MCE to invite Qualified Respondents for Workshop	2/10/2016
Workshop with Qualified Respondents (by invitation)	2/17/2016
Clarifying Questions from Respondent Due to MCE	2/22/2016
Responses to Clarifying Questions posted by MCE	2/29/2016
Offers due from Respondent	3/9/2016
MCE interviews with selected Respondents	3/10/2016 - 3/23/2016
Negotiations with Counterparties	3/30/2016
MCE Selects of Generation SC Services provider	4/29/2016
MCE Selects Load Forecasting provider	5/30/2016
MCE Selects Load SC Services provider	6/29/2016
MCE Selects Portfolio Management Services Provider	6/29/2016

6. **MCE Legal Obligations:** MCE is required to comply with the Public Records Act as it relates to the treatment of any information marked “confidential.” All information clearly marked “confidential ” will not be subject to disclosure during negotiations however all confidential materials retained by MCE after contract execution may be subject to release through the Public Records Act. MCE is not obligated to respond to any offer submitted as part of this Scheduling Services RFO. MCE may elect to contract with one or more respondents to this RFO and retains the right to reject all responses at MCE’s sole discretion.



Scheduling Services Request For Offers Update

Greg Brehm - Director of Power Resources | Marin Clean Energy

March 7, 2016



Scheduling Services RFO Purpose

Background: MCE currently has Scheduling Coordination (SC) service agreements with Shell Energy North America (SENA) for Generation, set to expire 9/6/2016 and Load, set to expire 12/31/2017

Purpose: MCE is soliciting offers to replace/ enhance the following services which are currently provided by Shell:

1. Generation Scheduling Coordination (SC)
2. Load SC
3. Load Forecasting (seeking to enhance accuracy & reduce imbalance energy exposure)
4. Portfolio Management (limited services at present)



Summary of Four Service Categories

1. **Generation Scheduling Coordination (SC)**: perform scheduling for power generation resources on a day-ahead, hour-ahead, real-time basis as required; Provide monthly reporting and access to CAISO Statements; support/ provide invoice validation, seeking to add “Shadow settlement” services
2. **Load SC**: perform scheduling of MCE forecast load on a day-ahead/hour-ahead/real-time basis as required
3. **Load Forecasting**: perform forecasting for load on a week-ahead/day-ahead/hour-ahead/real-time basis, as required
4. **Portfolio Management**: Recommend strategies for short term portfolio optimization and risk mitigation, within parameters of MCE’s Risk Policy; manage Congestion Revenue Rights (CRR) bids and CRR portfolio to mitigate congestion costs.



Existing Scheduling Services Arrangement

Highlights of Existing Scheduling Services Agreement with SENA:

- SENA has provided scheduling services for MCE since 2011
- Part of a 'Full Requirements' Services Agreement; SENA schedules and delivers load following power to MCE load for a fixed price
- SENA posts collateral required at CAISO on behalf of MCE
- SENA has managed all CRRs all non- generator specific paths



New Scheduling Service Requirements

What is MCE looking to replace/ add?

- MCE is looking for existing services plus the following:
 - Enhanced customer access to MCE & market data via user-friendly dashboards and hosted database for more robust portfolio analysis
 - Optimization of financial CRR portfolio
 - MCE seeks to manage load with generation contracts & Costs independent of wholesale power marketing
 - Enhanced short term portfolio management & DA + RT revenue enhancement
 - Enhanced/ automated power settlements and invoice validation



New Scheduling Service Requirements

What activities is MCE retaining?

- MCE staff and consultants will retain the following:
 - Long term portfolio planning and risk management
 - Long term power contracting (Open Season & Ad Hoc)
 - Optimization of Physical Path CRR portfolio
 - MCE compliance reporting
 - MCE Renewable Portfolio tracking and management
 - Final review of power settlements and invoice validation



Scheduling Services RFO Timeline

MCE initiated the RFO on 1/21/2016 and received Statements of Qualifications from sixteen respondents.

MCE RFO for Energy Scheduling, Forecasting and Portfolio Management Services Selection Process	
Schedule of Requirements	Target Dates and Deadlines (by 5 PM PST)
Issue RFO	1/21/2016
Statement of Qualifications due to MCE	2/3/2016
Indicative Pricing due to MCE	2/11/2016
MCE to invite Qualified Respondents for Interview	2/16/2016
Interviews	2/23/2016- 3/2/2016
Clarifying Questions from Respondent Due to MCE	2/26/2016
Responses to Clarifying Questions posted by MCE	3/2/2016
<u>Offers due from Respondent</u>	<u>3/9/2016</u>



RFO Response

- **16 Respondents, MCE shortlisted 10 (combined 6 offers)**
- **Six offers included:**
 - **Full suite of services requested by MCE**
 - **Scheduling services separated from power marketing**
 - **Collateral posting with CAISO**
 - **Local development electrical engineering support**
 - **Hosted Database and shadow settlement**
 - **Local SC scheduling desk with back up desk**
 - **Various power portfolio software platforms & database**



Shortlisted Offer Highlights (1 of 3)

- **Customized Energy Solutions (CES) and 3 Phases**

- Location: Folsom, CA (CES) and El Segundo, CA (3Phases)
- Team has redundant experience in scheduling services; CES has robust CRR optimization methodology



- **Ascend Analytics/American PowerNet (APN) /APX, Inc.**

- Location: Denver, CO (Ascend), Pennsylvania (APN), APX (San Jose, CA)
- Team has integrated software solution; robust analytics for portfolio management



Shortlist Offer Summary (2 of 3)

- **ZGlobal Power Engineering & Energy Solutions**

- Location: Folsom, CA
- Provide high quality settlements and team has extensive experience at CAISO; small team focused on customer service



- **Tenaska Power Services Co.**

- Location: team split between CA and Virginia
- Wide market experience; active participant in many ISOs across US; manages 20 load serving entity's portfolios.



Shortlist Offer Summary (3 of 3)

- **Northern California Power Agency**

- Location: Roseville, CA
- Formed in 1968, is a JPA; large staff dedicated to energy services; and can offer MCE membership or strictly service based contracts



- **The Energy Authority**

- Location: Bellevue, WA
- Non-profit power marketing; 49 employees (17 traders); provides services to 50 municipal and state-chartered load serving entities.



Questions? Comments?

