Attachment 1

May 14, 2014

By: Email
Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd., Suite 1000
South San Francisco, CA 94080

RE: The Potential Environmental Impacts of the Marin Clean Energy Authority Program

Dear Ms. Klebaner:

You asked me to review the Marin Clean Energy Authority's (MCEA) Community Choice Aggregation program, known as Marin Clean Energy (MCE), to determine whether the program may result in physical impacts to the environment. I have reviewed the MCEA Integrated Resource Plan update from November 2013, the 2012 annual power content label and supporting data for MCEA, and MCEA's procurement contract with Shell Energy North America (SENA). The MCE program has changed the supplier of electricity for over one hundred thousand residents of Marin County and the City of Richmond in Contra Costa County. This change has in turn caused (and will continue to cause as new load joins MCE) changes in the mix of generating resources producing electricity in the western U.S. grid. Those changes, in turn, affect the nature and location of environmental impacts associated with operating existing electrical generation. These changes occur on different time scales, as discussed below.

I. CHANGES IN HOURLY DISPATCH

Implementation of the MCE program does not, in the very short term, affect the amount of renewable generation in the Western U.S. grid. In a particular hour, any already-built renewable generation will operate and generate electricity, whether or not it has a contract, as long as its marginal cost of generation is less than the spot price for electricity on the open market. If it has a contract it will sell electricity pursuant to that contract; if it doesn't have a contract, it can sell electricity in any of several spot markets, such as the CAISO day-ahead hour-ahead, and real-time markets. Since most of the cost for most renewable technologies is the capital cost of the generator, and not fuel cost (e.g., wind and solar generation have no marginal cost for fuel), such generators tend to run at their full technical capability once built. Thus, the short-run marginal changes in supply sources caused by the MCE program tend to be changes in fossil-fuel generation.

For example, if PG&E currently gets its marginal generation from gas-fired powerplants under contract to it, the MCE program causes decreased generation from those gas-fired powerplants because the MCE program decreases the loads served by PG&E, and thus decreases PG&E's generation from its marginal sources of supply. As a result, MCE will cause increased generation from marginal fossil-fueled generation

operating elsewhere to meet the load that has been shifted from PG&E to MCE. The result is that fossil-fueled generation will decrease in some locations, and increase in others. Air pollutant emissions will correspondingly decrease in some locations and increase in others.

In 2012, MCE had total retail sales of 570 gigawatthours (gwh), of which 226 gwh was "unspecified power" and another 203 gwh was claimed as renewable but actually involved Renewable Energy Credits (RECs).[1] Thus, up to 429 gwh (83%) of MCE's sales were of electricity generated by non-renewable sources, in different locations than the sources that would have supplied MCE's customers were they still served by PG&E. This effect would increase as new load joins MCE.

II. CHANGES IN DISPATCH ON A LONGER TIME SCALE

Over a longer time scale than hourly, but not so long as to allow construction of new generation in response to the MCE program, there are also likely to be changes to the generation mix serving MCEA. An unbundled REC is sold separately from renewable generation and represents the past operation of the renewable resource but real-time dispatch of non-renewable resources. For example, when the MCE program buys unbundled RECs, as it did for 36% of its energy supply in 2012, then the energy deliveries for that 36% of the program's energy supply will be made by real-time dispatch of non-renewable resources. The RECs are used to make sure that the amount of real-time non-renewable resource generation is no greater than the past renewable generation. This will, as in the case of real-time dispatch, mean that there is no actual increase in renewable generation over what would have occurred in the absence of the MCE program. Past generation won't be changed. But the choice of which non-renewable generation gets RECs applied to it will change, as the choice of real-time sources of generation changes from PG&E to the supplier for the MCE program. So, once again, there will be changes in the fossil-fired generation mix due to the MCE program, with corresponding changes in the location and quantity of associated emissions.

III. CHANGES IN THE CONSTRUCTION OF NEW GENERATION

The MCE program is intended to allow MCEA customers to choose a resource portfolio that will include (either directly, or via RECs) more Renewable Portfolio Standard-eligible resources than it would otherwise have included. To the extent the program is successful, less renewable generation would be available for other electricity consumers to use,[2] unless the MCE program actually causes the construction of new renewable resource generation that would not otherwise have been built. Absent incremental new renewable generation, the MCE program will thus not change the amount of renewable generation, but will instead change the location of (and the purchasers of) non-renewable generation, as discussed above.

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[1] See discussion in section IIII regarding why unbundled RECs do not change renewable energy generation.
[2] As discussed above, if the quantity of installed renewable generation does not change, then there is no reason to expect the quantity of generation from that installed generation to change, since the marginal costs of operating already-built renewable generation are so low.

If the MCE program **does** cause the construction of new renewable generation that would otherwise not have been built, then there will indeed be reductions in non-renewable generation in the aggregate. Even in that situation though, individual non-renewable generators may see their output go up even while total non-renewable generation is shrinking. This is because the incremental renewable generation built for use in the MCE program will tend to displace marginal PG&E gas-fired resources, while nonrenewable generation scheduled as part of the MCE program (due to the use of RECs in that program) will tend to come from powerplants not contracted to PG&E. Thus, even if the net amount of nonrenewable generation goes down, there may well be increases in generation at particular nonrenewable generators. What is clear is that, if the MCE program causes the construction of new renewable generation that would otherwise not have been built, then there will be local environmental impacts, such as land use impacts and biological impacts, associated with the construction and operation of that new generation.

The extent to which new load joining the MCE program may cause the construction of new renewable resources that would otherwise not be built is quite unclear. MCEA's October 2013 Load and Resource Tables (Appendix A to its November 2013 Integrated Resource Plan Update) show that its planned new renewable resources over the future period 2015-22, other than RECs, amount to an average of just 89 gwh per year. The corresponding figure for RECs is 295 gwh each year, while MCEA's planned acquisition of new conventional energy resources averages 540 gwh per year. The only definite newly built renewable resources in MCEA's plans are 10 Mw of local solar generation. Other new resources, such as 88 gwh per year of geothermal energy from Calpine starting in 2017, represent sales from existing powerplants, and thus simply shift to MCEA renewable generation that would have occurred anyway and would have been sold to someone else if not to MCEA.

IV. CONCLUSION

In sum, new load joining the MCE program will cause changes to the physical environment by changing the quantity of air pollutant emissions at existing generation facilities due to changes in the operation of existing fossil fuel facilities and a change in the resource mix that supplies MCEA's electricity demand. The MCE program may also cause the construction of new renewable generation facilities over the long term, and related changes in the operation of existing fossil fuel generation, resulting in land use changes and impacts to biological resources, among other environmental impacts.

Please do not hesitate to contact me if you have any questions regarding this matter.

Sincerely,

David Marcus

May 14, 2014

By: Email

Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd., Suite 1000
South San Francisco, CA 94080

RE: The Potential Environmental Impacts of the Sonoma County Power Program

Dear Ms. Klebaner:

You asked me to review the Sonoma County Power (SCP) Community Choice Aggregation (CCA) program, to determine whether the program may result in physical impacts to the environment. In doing so, I have reviewed the SCP procurement contracts with Exelon and Calpine. The SCP CCA program would change the supplier of electricity for tens of thousands of customers. This change would in turn cause changes in the mix of generating resources producing electricity in the western U.S. grid. Those changes affect the nature and location of environmental impacts associated with operating existing electrical generation. These changes occur on different time scales, as discussed below.

I. CHANGES IN HOURLY DISPATCH

Implementation of the SCP CCA program does not, in the very short term, affect the amount of renewable generation in the Western U.S. grid. In a particular hour, any already-built renewable generation will operate and generate electricity, whether or not it has a contract, as long as its marginal cost of generation is less than the spot price for electricity on the open market. If it has a contract it will sell electricity pursuant to that contract; if it doesn't have a contract, it can sell electricity in any of several spot markets, such as the CAISO day-ahead hour-ahead, and real-time markets. Since most of the cost for most renewable technologies is the capital cost of the generator, and not fuel cost (e.g., wind and solar generation has no marginal cost for fuel), such generators tend to run at their full technical capability once built. Thus, the short-run marginal changes in supply sources caused by the SCP CCA program will tend to be changes in fossil-fuel generation.

For example, if PG&E currently gets its marginal generation from gas-fired powerplants under contract to it, the SCP CCA program causes decreased generation from those gas-fired powerplants because the SCP CCA program decreases the loads served by PG&E, and thus decreases PG&E's generation from its marginal sources of supply. As a result, there is increased generation from marginal fossil-fueled generation elsewhere to meet the Sonoma load that has been shifted from PG&E to SCP CCA. The result is that fossil-fueled generation will decrease in some locations, and increase in others. Air pollutant emissions will correspondingly decrease in some locations and increase in others. This effect would increase as new load joins the SCP CCA.

In 2014, SCP proposes to procure 420 gigawatthours (gwh) of electricity, of which 59 gwh will come from the existing Geysers 13 geothermal powerplant, 66 gwh will come from unbundled "category 3" renewable energy credits (RECs)[1] 17 gwh will come from Category 2 RECs, 152 gwh will come from unspecified (but not nuclear) carbon-free resources that do not qualify as renewable under California's Renewable Portfolio Standard (RPS) program,[2] and a further 126 gwh will be from unspecified carbon-emitting generation, presumably natural gas.[3]

Geysers 13 is an existing plant that has been in operation for approximately 30 years, and would presumably operate whether sold to SCP or not. Unbundled RECs, also referred to as "Category 3" resources, are sold separately from renewable generation and represent the past operation of the renewable resource but real-time dispatch of non-renewable resources. Thus, at most 17 gwh (4 percent) of SCP's 2014 procurement could come from RPS-eligible new renewable resources.[4] And 96-100 percent of SCP's 2014 electricity will come from non-RPS sources in different locations than the sources that would have supplied SCP's customers were they still served by PG&E, or else from renewable resources that would have operated with or without SCP (i.e., Geysers 13).

II. CHANGES IN DISPATCH ON A LONGER TIME SCALE

Over a longer time scale than hourly, but not so long as to allow construction of new generation in response to the SCP CCA program, there are also likely to be changes to the generation mix serving SCP's customers. For example, when the SCP program uses Category 3 RECs, as it proposes to do for 13-16% of its energy supply in 2014-16,[5] then the energy deliveries under the program that are tied to RECs will actually reflect past operation of renewable resources but real-time dispatch of non-renewable resources. The RECs are used to make sure that the amount of real-time non-renewable resource generation is no greater than the past renewable generation. This will, as in the case of real-time dispatch, mean that there is no actual increase in renewable generation over what would have occurred in the absence of the SCP CCA program. Past generation won't be changed. But the choice of which non-renewable generation gets RECs applied to it will change, as the choice of real-time sources of generation changes from PG&E to the supplier for the SCP CCA program. So, once again, there will be changes in the fossil-fired generation mix due to the SCP CCA program, with corresponding changes in the location and quantity of associated emissions.

III. CHANGES IN THE CONSTRUCTION OF NEW GENERATION

The SCP CCA program is intended to use a procurement mix that will count as 33% renewable for RPS purposes, and 70% carbon-free for greenhouse gas emissions

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[1] See discussion in Section III as to why unbundled RECs do not change renewable energy generation.
[2] Hydro generation from existing large (>30 Mw) dams is an example of such generation.
[3] See Table 1.
[4] Ibid., sum of lines 3 and 4.
[5] Ibid.

purposes.[6] However, in years 2014-16 SCA proposes that its 33+% of RPS-eligible resources[7] will consist of 14-20 percent Geysers 13 generation[8] (which simply diverts to SCP renewable generation that would have existed anyway) and 13-16% category 3 RECs (which simply labels non-renewable generation as RPS-eligible based on linking it to renewable generation from the past). SCP proposes to acquire less than 5 percent of its electricity from new generation qualifying for the RPS (solar, wind, geothermal, small hydro and biomass).[9]

Even for that 4-5% of SCA's proposed procurement, less renewable generation would be available for other electricity consumers to use,[10] unless the SCP CCA program actually causes the construction of new renewable resource generation that would not otherwise have been built. Absent incremental new renewable generation, the SCP CCA program will not change the amount of renewable generation. It will merely change who buys the existing renewable generation. In doing so, it will also change the location of (and the purchasers of) non-renewable generation, as discussed above.

If the SCP CCA program **does** cause the construction of new renewable generation that would otherwise not have been built, then there will indeed be reductions in non-renewable generation in the aggregate. Even in that situation though, individual non-renewable generators may see their output go up even while total non-renewable generation is shrinking. This is because the incremental renewable generation built for use in the SCP CCA program will tend to displace marginal PG&E gas-fired resources, while nonrenewable generation scheduled as part of the SCP CCA program (due to the use of Category 3 RECs in that program) will tend to come from powerplants not contracted to PG&E. Thus even if the net amount of nonrenewable generation goes down, there may well be increases in generation at particular nonrenewable generators. What is clear is that, if the SCP CCA program causes the construction of new renewable generation that would otherwise not have been built, then there will be local environmental impacts, such as land use impacts and biological impacts, associated with the construction and operation of that new generation.

The extent to which new load joining the SCP CCA program will in fact cause the construction of new renewable resources that would otherwise not be built is quite unclear. SCP's contracts with Exelon and Calpine show that its planned new renewable resources over the period 2014-16, other than category 3 RECs, amount to at most just 22

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[6] Exelon confirmation, 11/19/13, Exhibits B (RPS) and D (carbon-free energy). Note that achievement of the 70% goal relies upon counting Category 3 RECs as carbon-free (Table 1, Lines 10 and 11). Doing so may not be consistent with the California Air Resources Board's rules for calculating the emissions associated with Category 3 RECs.

[7] Actually 34-37%; see Table 1, line 9.

[8] Table 1, line 7.

[9] Table 1, lines 3 plus 4. The resources on Lines 1 and 2 are not RPS-eligible, the resources on line 5 are category 3 RECs for which the associated renewable generation is in the past, and the resources on line 7 are from an existing renewable generator, not a new one.

[10] As discussed above, if the quantity of installed renewable generation does not change, then there is no reason to expect the quantity of generation from that installed generation to change, since the marginal costs of operating already-built renewable generation are so low.

gwh per year.[11] The corresponding figure for Category 3 RECs is 75 gwh each year,[12] while SCP's planned acquisition of conventional energy resources averages 157 gwh per year.[13] The SCP contracts contain no obligation by the sellers to provide any generation to SCP from newly built renewable resources. The Calpine contract for an average of 87 gwh per year[14] is for an existing resource, and thus simply shifts to SCP renewable generation that would have occurred anyway and would have been sold to someone else if not to SCP.

IV. CONCLUSION

In sum, new load joining the SCP CCA program will cause changes to the physical environment by changing the quantity of air pollutant emissions at existing generation facilities due to changes in the operation of existing fossil fuel facilities and a change in the resource mix that supplies SCP's electricity demand. The SCP CCA program may or may not cause the construction of new renewable generation facilities over the long term, and related changes in the operation of existing fossil fuel generation, resulting in land use changes and impacts to biological resources, among other environmental impacts.

Please do not hesitate to contact me if you have any questions regarding this matter.

Sincerely,

David Marcus

[11] Table 1, lines 3 plus 4. The portion of the amount shown on those lines that will be from new renewable resources could be anywhere between none and all.
[12] Table 1, line 5.
[13] Table 1, line 1.
[14] Table 1, line 7.

RESUME

DAVID I. MARCUS
1541 Juanita Way
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April 2014

Employment

Self-employed, March 1981 - Present

Consultant on energy and electricity issues. Clients have included Imperial Irrigation District, the cities of Albuquerque and Boulder, the Rural Electrification Administration (REA), BPA, EPA, the Attorney Generals of California and New Mexico, the California Public Utilities Commission, alternative energy and cogeneration developers, environmental groups, labor unions, other energy consultants, and the Navajo Nation. Projects have included economic analyses of utility resource options and power contracts, utility restructuring, utility bankruptcy, coal and nuclear power plants, non-utility cogeneration plants, and offshore oil and hydroelectric projects. Experienced user of production cost models to evaluate utility economics. Very familiar with western U.S. grid (WSCC) electric resources and transmission systems and their operation and economics. Have also performed EIR/EIS reviews and need analyses of proposed coal, gas and hydro powerplants, transmission lines, substations, and coal mines. Have presented expert testimony before FERC, the California Energy Commission, the Public Utility Commissions of California, New Mexico, and Colorado, the Interstate Commerce Commission, and the U.S. Congress.

Environmental Defense Fund (EDF), October 1983 - April 1985

Economic analyst, employed half time at EDF's Berkeley, CA office. Analyzed nuclear power plant economics and coal plant sulfur emissions in New York state, using ELFIN model. Wrote critique of Federal coal leasing proposals for New Mexico and analysis of southwest U.S. markets for proposed New Mexico coal-fired power plants.

California Energy Commission (CEC), January 1980 - February 1981

Advisor to Commissioner. Wrote "California Electricity Needs," Chapter 1 of Electricity Tomorrow, part of the CEC's 1980 Biennial Report. Testified before California PUC and coauthored CEC staff brief on alternatives to the proposed 2500 megawatt Allen-Warner Valley coal project.

CEC, October 1977 - December 1979

Worked for CEC's Policy and Program Evaluation Office. Analyzed supply-side alternatives to the proposed Sundesert nuclear power plant and the proposed Point Concepcion LNG terminal. Was the CEC's technical expert in PG&E et. al. vs. CEC lawsuit, in which the U.S. Supreme Court ultimately upheld the CEC's authority to

regulate nuclear powerplant siting.

Energy and Resources Group, U.C. Berkeley, Summer 1976

Developed a computer program to estimate the number of fatalities in the first month after a major meltdown accident at a nuclear power plant.

Federal Energy Agency (FEA), April- May 1976

Consultant on North Slope Crude. Where To? How?, a study by FEA's San Francisco office on the disposition of Alaskan oil.

Angeles Chapter, Sierra Club, September 1974 - August 1975

Reviewed EIRs and EISs. Chaired EIR Subcommittee of the Conservation Committee of the Angeles Chapter, January - August 1975.

Bechtel Power Corporation (BPC), June 1973 - April 1974

Planning and Scheduling Engineer at BPC's Norwalk, California office. Worked on construction planning for the Vogtle nuclear power plant (in Georgia).

Education

Energy and Resources Group, U.C. Berkeley, 1975 - 1977

M.A. in Energy and Resources. Two year master's degree program, with course work ranging from economics to engineering, law to public policy. Master's thesis on the causes of the 1972-77 boom in the price of yellowcake (uranium ore). Fully supported by scholarship from National Science Foundation.

University of California, San Diego, 1969 - 1973

B.A. in Mathematics. Graduated with honors. Junior year abroad at Trinity College, Dublin, Ireland.

Professional Publications

"Rate Making for Sales of Power to Public Utilities," with Michael D. Yokell, in Public Utilities Fortnightly, August 2, 1984.