Sent via email December 21, 2017

Re: Low Carbon Fuel Standard: Electricity as a Transportation Fuel

Dear Mr. Wade:

CalETC supports and advocates for the transition to a zero-emission transportation future as a means to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes: Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, and other industry leaders supporting transportation electrification.

CalETC supports the Low Carbon Fuel Standard (LCFS), a program that has been successful thus far in reducing the carbon intensity of California's transportation fuel pool. Given the near-total dependence on oil in the transportation fuels sector, the LCFS is essential to California's efforts to both diversify the transportation fuels sector and reduce emissions from carbon-based fuel.

CalETC also supports the current program design, utilities generating LCFS credits for residential charging and returning the value of those credits to electric vehicle drivers. Both CalETC and the utilities are committed to continue working with stakeholders and regulators to improve utility investment of LCFS credit value, such that this investment effectively accelerates the market for electric vehicles and supports the Administration and Legislature in meeting their transportation electrification goals. The utilities are uniquely positioned to work with the regulators and legislature to invest the LCFS credit value as they are either local public entities, as is the case with publicly-owned utilities, or they are economically regulated, as it is the case with investor-owned utilities.

We appreciate this opportunity to provide feedback to CARB staff on proposed modifications to some of the electricity-related provisions of the LCFS that add to our prior letters.

1. Expanding Electricity Credit Generation Potential

   CalETC recommends that LCFS credit value be granted only for quantifiable climate change emission reductions.

   If there is a potential to reduce emissions but the emissions have not yet been reduced and/or the emission reductions are uncertain, LCFS credit value should not be granted. Although CalETC is supports fast charging, we do not support LCFS credits for the capacity of fast chargers. CalETC does support existing LCFS credits for electricity fuel throughput at fast charging stations, these LCFS credits represent emissions reductions associated with using electricity fuel. Similarly, although CalETC supports managed charging or "smart" charging, we do not support LCFS credits for smart charging unless real quantifiable GHG emission reductions can be verified, which we do not believe

to be possible at this time. LCFS credits for the capacity of a fast charger or smart charging are not appropriate given the GHG reductions are non-existent, uncertain and/or not quantifiable.

2. Data Sources for carbon intensity (CI) for statewide average electricity or EDU-specific electricity

CARB staff is proposing using USEPA e-GRID data for the statewide average electricity fuel CI and has asked for comment on other data sources. CARB staff is also proposing to update this CI annually, and is considering a table showing EDU specific electricity fuel CIs.

CalETC supports allowing each EDU to select among electricity fuel CI options listed in a CARB-calculated look-up table. The CIs would be developed by CARB from robust data sources and would be either a statewide average or EDU specific. CalETC supports annual updates to the electricity fuel CI options in the look-up table.

CalETC has examined several data sources that we believe provide a more robust carbon intensity number for electricity transportation fuel, relative to USEPA eGRID, and we summarize our analysis in Appendix A. Although USEPA e-grid is a viable and robust data source, CalETC believes other data sources are more robust for the purposes of calculating electricity fuel carbon intensity in 2018 and beyond. These alternative data sources are already collected and verified by California state agencies. They are more frequently updated given the renewable portfolio standard requirements for electricity. The data sources CalETC and EPRI analyzed, with the support of the CA utilities, are more likely to reflect the actual CI for electricity used as a transportation fuel. Some of the data sources we evaluated can be used to create EDU specific electricity fuel carbon intensity.

CalETC recommends each of the data sources listed in Appendix A of this letter be used by CARB to calculate the electricity fuel carbon intensity in a look-up table. EDU specific electricity fuel CIs can be calculated using either the power content label data source or the simplified marginal methodology, and published in a look-up table or posted for all EDUs on the Pathways website.

CalETC also notes that these data sources more accurately reflect the CI for electricity transportation fuel over time, as the EDUs comply with GHG reduction requirements and the renewable portfolio standard applicable to this fuel source.

Regards,

Eileen Wenger Tutt
Executive Director

Attachment A

Review of potential carbon intensity data sources

eGRID

The Emissions & Generation Resource Integrated Database (eGRID) is a dataset released by the US Environmental Protection Agency (EPA) which has been used to calculate electricity carbon intensity factors. The dataset covers the entire US at a regional level, so it can be used for both California and all other regions of the US. However, the processing that the EPA does is relatively time-intensive and expensive, so there is a significant delay in publication and the dataset is only released approximately every two years (this is funding-dependent, so there is no guarantee of future release dates). Additionally, the latest version, with data for 2014, contained a change in the methodology used to allocate plants to regions, so almost no imported electricity is included in the California grid region (CAMX, which is slightly different from the state boundaries). California imports about a quarter of the electricity it uses.

CEC QFER

The CEC's Quarterly Fuel and Energy Report (QFER) contains information related to the operation of generators, including the amount of electricity generated and the quantity of fuel required to produce this power. This provides a relatively high degree of precision concerning in-state generation of electricity, it does not include data on imported electricity.

CARB Mandatory Reporting of Greenhouse Gas Emissions

The Mandatory Reporting of Greenhouse Gas Emissions (reporting regulation or MRR) dataset contains information on the GHG emissions of every major emissions source in California, including most emitting power plants and power plants in other areas that provide specified electricity imports. This data provides a high amount of precision concerning GHG emissions of these plants, but it does not contain information on non-emitting plants and does not include information on upstream emissions. Information on upstream emissions from other data sources is included in the table below.

Power Content Label

Each utility is required to submit information about the sources of electricity for each service territory, including estimates of sources for imported electricity. This could be used to calculate utility-specific carbon intensities which include the widest scope of generation sources. The latest data is for 2016. The CEC is currently revising the reporting methodology for power content labels, and the proceedings are not expected to be concluded until after the LCFS regulations are updated.

Simplified Marginal

The simplified marginal methodology is based on utilities' power purchases compliant with California regulations, and better reflects the CI of electricity as a transportation fuel. EDUs in California are required by the Renewable Portfolio Standard (RPS) to ensure that a percentage of electricity is obtained from renewable sources, this percentage increases over time, from 33% in 2020 to 50% in 2030. The remaining percentage of electricity that is purchased or produced by the utility on the margin to serve new load (such as transportation electrification) comes from the most efficient (lowest carbon) power plants, combined cycle natural gas (CCNG) power plants. The methodology for the simplified marginal calculation therefore assumes that new load will be served by a fixed amount of renewable generation based on the RPS with the

remainder served by CCNG. Given that the RPS is a lower bound on renewable generation and CCNG is an upper bound on remaining generation this should be a conservative estimate of the electricity supplied to incremental loads.

Comparison of data sources for electricity fuel carbon intensity (CI)

Top Criteria	Simplified Marginal[a] 2018-2020	Simplified Marginal[b] 2021-2024	Simplified Marginal[c] 2025-2027	Simplified Marginal[d] in 2028-2030	USEPA eGRID[e]	CEC QFER Database[f]	GHG CARB MRR[g]	Power content label rulemaking[h]
Can provide statewide average?	Y	Y	Y	Y	Y	Y	Y	Y
Can be EDU specific?	Y[1]	Y[1]	Y[1]	Y[1]	N	N	N	Y
Can be updated annually? (off-reg)	Y	Y	Y	Y	N	Y	Y	Y
Does one EDU opting out of statewide # impact other EDUs?	N	N	N	N	Y	Y	Y	No if EDUs all use EDU specific
Does it account for all renewables under utility contract or ownership?	Y	Y	Y	Y	Y	N	Can be no	not determined yet
Can account for all out-of-state emissions?	N/A[2]	N/A[2]	N/A[2]	N/A[2]	N[3]	N	Y[4]	Y[4]
Can account for all in-state generation	N/A	N/A	N/A	N/A	Y[5]	Y[5]	N[5,6]	Y[5] (some exceptions)
Is the data recent?	Y	Y	Y	Y	N	Y	Y	Y
Is rooftop solar included?	N	N	N	N	N	N	N	N
Is the data available yet?	Y	Y	Y	Y	Y	Y	Y	Yes and No[7]
Future focused?	Y	Y	Y	Y	N	N	N	N
Past focused?	Y	Y	Y	Y	Y	Y	Y	Y
Data year for the rows below	Compliance	Compliance	Compliance	Compliance	2014	2016	2016	2016
CI (g CO2/MJ) including upstream[10]	94.52	86.3	80.36	74.46	98.49	87.27	83.13[9]	89.46[8]
CI divided by EER (3.4)	27.80	25.38	23.64	21.90	28.97	25.67	24.45	26.31

Data Sources

a. Per the RPS regulations, by 2020, retail sellers must procure no less than 33% of their retail sales from eligible renewable energy resources, by December 31, 2020. The Power Mix used to calculate the CI in CA-GREET 3.0 is 33% Renewables and 67% Combined Cycle Natural Gas. The emission factor used for stack emissions for the combined cycle is from CA-GREET 3.0 (397 g/KWh).

b. Per the RPS regulations, for the compliance period 2021-2024, retail sellers must procure no less than 40% of their retail sales from eligible renewable energy resources, by December 31, 2024. (http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M171/K457/171457580.PDF). The CI value was calculated for utilities that have met or surpassed this requirement. The Power Mix used to calculate the CI in CA-GREET 3.0 is 40% Renewables and 60% Combined Cycle Natural Gas. The emission factor used for stack emissions for the combined cycle is from CA-GREET 3.0 (397 g/KWh).

c. Per the RPS regulations, for the compliance period 2025-2027, retail sellers must procure no less than 45% of their retail sales from eligible renewable energy resources, by December 31, 2027. (http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M171/K457/171457580.PDF). The CI value was calculated for utilities that have met or surpassed this requirement. The Power Mix used to calculate the CI in CA-GREET 3.0 is 45% Renewables and 55% Combined Cycle Natural Gas. The emission factor used for stack emissions for the combined cycle is from CA-GREET 3.0 (397 g/KWh).
d. Per the CPUC, for the compliance period 2028-2030, retail sellers must procure no less than 50% of their retail sales from eligible renewable energy resources, by December 31, 2030. (http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M171/K457/171457580.PDF). The CI value was calculated for utilities that have met or surpassed this requirement. The Power Mix used to calculate the CI in CA-GREET 3.0 is 50% Renewables and 50% Combined Cycle Natural Gas. The emission factor used for stack emissions for the combined cycle is from CA-GREET 3.0 (397 g/KWh).
e. The 2014 e-GRID Power Mix was used to calculate the CI value. (https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid)
f. The QFER CI Value is based on 2016 QFER Data from the CEC (http://www.energy.ca.gov/almanac/electricity_data/web_qfer/). The statistics presented here are derived from the QFER CEC-1304 Power Plant Owner Reporting Form. The CEC-1304 reporting form collects data from power plants with a total nameplate capacity of 1MW or more that are located within California or within a control area with end users inside California
g. The CI Value from the GHG MRR method pulls data from 3 sources.
    a. The 2016 CARB GHG MRR emissions are from the CARB website (https://ww2.arb.ca.gov/our-work/programs/mandatory-greenhouse-gas-emissions-reporting/data). The GHG MRR data was filtered to only include In-State Electricity Generating Units, Electricity Importers and Cogeneration Units.
    b. The power is obtained from the CEC total system generation (https://ww2.arb.ca.gov/our-work/programs/mandatory-greenhouse-gas-emissions-reporting/data). Total system electric generation is defined as the annual energy delivered from wholesale power plants, including self-generation supply, to meet annual demand. The total system electric generation includes in-state generation and imports.
    c. Finally, the upstream emissions for the life-cycle analysis were calculated using CA-GREET 3.0. A national average power mix was used to calculate the upstream emissions.
h. The 2016 Power Content Label for all the utilities list the 2016 CA-Power Mix (http://www.energy.ca.gov/pcl/). Approximately, 85% of the CA-Power Mix is considered specified, while the remainder is unspecified. The final CI value was obtained using the method below:
    a. The CI value for the specified portion of the Power Content Label was obtained by normalizing the specified portion of the power content and entering the resulting power-mix in CA-GREET 3.0
    b. The CI value for unspecified power was calculated using an emission factor of 428 g/KWh and a transmission loss factor of 1.02, which is consistent with the GHG MRR.
    c. The Specified and Unspecified CI values were then multiplied by their respective percentages of the total mix (i.e. the unspecified CI value was multiplied by 15% then added to 85% of the specified CI value. This resulted in a total “stack” or downstream CI value.

d. The upstream emissions for the life-cycle analysis were calculated using CA-GREET 3.0. A national average power mix was used to calculate the upstream emissions.
e. The downstream and upstream CI values were added together to develop a final CI number.

Notes

1. Each utility would have the same number for the years shown. This CI methodology is based on power purchases on the margin and includes 33%, 40% or 45%or 50% renewables depending on the year, and the remained is combined cycle natural gas (CCNG). If a utility was complying ahead of schedule, then it should be allowed to use the future year (with higher RPS). This type of marginal is conservative given the shift to long-term contracts and the fact that almost all power purchased on the margin for new load is now renewables.
2. Under the simplified marginal emission approach the power mix would consist of a set CCNG component and a renewable percentage that would meet the RPS obligations. Imports of CCNG and renewables would be captured as part of this generic mix.
3. Previous versions of eGRID had limited handling of imports, but the current version of eGRID includes almost no imports.
4. The CEC Power Content Label, and CARB MRR data can be used to calculate CI values for all imports. However, a portion of these imports would be categorized as "unspecified imports" and a methodology would have to be developed to account for this. CARB MRR data uses a default emissions factor for unspecified imports, the same could be used for Power Content Label data. The CEC will be developing this protocol in 2018.
5. Rooftop solar is excluded from many of these data sources. Some utilities, including SMUD, include a portion of rooftop solar in their PCL data. In addition, there is a limited amount of third-party rooftop solar RECs likely included in the PCL data.
6. Zero-emission plants and smaller peaker plants are not captured by the GHG MRR. The threshold for reporting is 10,000 Metric Tons of CO2 rather than plant generation capacity.
7. The total system power mix from the Power Content Label is currently available for 2016 and earlier years, but about 15% in 2016 is reported as unspecified imports. AB 1110 will modify the power content label so that utilities must also report carbon intensities associated with their electricity products. The Energy Commission staff proposes that CARB's default emission factor would be used for all sources of unspecified power. Staff also proposes that unbundled REC purchases and firmed and shaped purchases would not have zero carbon, while null power purchases from REC-stripped renewables would – problematic. Data not available for future years at present, but would be approximately 9-12 months after the end of each year. (http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-05/TN219931_20170627T133033_Assembly_Bill_1110_Implementation_Proposal_for_Power_Source_Dis.pdf)
8. CI Value accounts for unspecified imports and assumes a carbon intensity of 0.428 MT/MWh (see below for further discussion on unspecified default factor). Value shown is for 2016 data.
9. Possible to do if two different data sources are used – one for emissions, and one for GWh. Includes 15.58 g/MJ for upstream emissions including fuel extraction, pipelines and fuel transport using CA Greet system average mix.

10. Upstream includes 15.48 g/MJ of CO2e from sources such as extraction, transport and pipelines based on average fuel production mix from CA-GREET model. While this upstream emission number is the same for all the columns in the table above, CalETC recommends that the g/MJ upstream emissions for the simplified marginal columns should not be based on an average fuel mix, but instead linked to the appropriate marginal mix (linked to RPS compliance).