

Preliminary Discussion Draft

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

**Subarticle 5.2. Fuel Cell Net Energy Metering
Greenhouse Gas Emission Standards**

§ 95408. Purpose

The purpose of this regulation is to implement section 2827.10(b) of the Public Utilities Code.

§ 95409. Applicability

The provisions of this Article shall apply to participants in the Fuel Cell Net Energy Metering program.

§ 95410. Definitions and Acronyms

(a) For the purposes of this Article, the following definitions apply.

- (1) **“British Thermal Unit” or “Btu”** means the quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit at about 39.2 degrees Fahrenheit.
- (2) **“Carbon dioxide” or “CO₂”** means the most common of the six primary greenhouse gases, consisting on a molecular level of a single carbon atom and two oxygen atoms.
- (3) **“Carbon dioxide equivalent” or “CO₂e”** means the number of metric tons of CO₂ emissions with the same global warming potential as one metric ton of another greenhouse gas when calculated using the individual global warming potentials as specified in the “global warming potential” definition of this article.
- (3) **“Global warming potential” or “GWP”** means the ratio of the time-integrated radiative forcing from the instantaneous release of one kilogram of a trace substance relative to that of one kilogram of a reference gas, i.e., CO₂. For 2011 through 2020 data years, the GWP values used for emissions estimation and reporting are as specified in Table A-1 to Subpart A of Title 40, Code of Federal Regulations (CFR) Part 98 as published to the Federal Register on 10/30/2009. For data years 2021 and onward, the GWP values are as specified in the Table A-1 to Subpart A of Title 40 Code of Federal Regulations Part 98 as published to the CFR on 12/11/2014, which is hereby incorporated by reference.

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- (4) **“Greenhouse gas” or “GHG ”** means carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases.
- (5) **“Megawatt-hour” or “MWh”** means the electrical energy unit of measure equal to one million watts of power supplied to, or taken from, an electric circuit steadily for one hour.

§ 95411. Greenhouse Gas Emission Standards

The annual greenhouse gas emission standards for eligibility in the Fuel Cell Net Energy Metering Program shall be:

Year	Annual GHG Emission Standard (kg CO ₂ e/MWh)
2017	409
2018	399
2019	389
2020	379
2021	370
2022	360

§ 95412. Greenhouse Gas Emission Standards Methodology

- (a) Beginning in 2022, and every three years thereafter, the Executive Officer shall calculate the annual greenhouse gas emission standards for the next three years and publish them on the CARB website using the following process. The calculation will be performed the second Monday of November and published on the CARB website within five business days.
- (1) Calculate the standard for the calendar year following the year in which the tri-annual update is occurring using the following equation:

$$FCNEM_{y+1} = CSC ER_{y-1} * 0.001 * 53.07 * \frac{8760 - HR0_y}{8760} * 1.000962$$

Where:

FCNEM_{y+1} = FCNEM emission standard for year y+1 (kgCO₂e/MWh)

y = Calendar year in which the update is occurring

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CSC ER_{y-1} = Heat rate for combined/simple cycle gas power plants for year y-1 or the most recent year that data is available from the most recently published California Energy Commission Thermal Efficiency of Gas-Fired Generation in California¹ (MMBtu/MWh)

0.001 = Conversion factor Btu/kWh to MMBtu/MWh

53.07 = Conversion factor MMBtu/MWh to kgCO₂/MWh

8760 = Number of hours in a year

HR0_{y-1} = Hours the day-ahead price of generation was at or below \$0.00 for year y-1 or the most recent year that data is available from the most recently published CAISO Annual Report on Market Issues and Performance for day-ahead market prices²

1.000962 = CO₂e/CO₂ conversion factor³

- (2) Calculate the standard for the calendar year two years after the year in which the tri-annual update is occurring using the following equation:

$$FCNEM_{y+2} = FCNEM_{y+1} * 0.975$$

Where:

FCNEM_{y+2} = FCNEM emission standard for year y+2 (kgCO₂e/MWh)

y = Calendar year in which the update is occurring

0.975 = Adjustment to reduce annual GHG emission standard by 2.50 percent

- (3) Calculate the standard for the calendar year three years after the year in which the tri-annual update is occurring using the following equation:

$$FCNEM_{y+3} = FCNEM_{y+2} * 0.975$$

¹ [Thermal Efficiency of Natural Gas-Fired Generation Reports](https://ww2.energy.ca.gov/almanac/electricity_data/Thermal_Efficiency_reports.html)
https://ww2.energy.ca.gov/almanac/electricity_data/Thermal_Efficiency_reports.html

² [Annual Report on Market Issues and Performance](http://www.caiso.com/market/Pages/MarketMonitoring/AnnualQuarterlyReports/Default.aspx)
<http://www.caiso.com/market/Pages/MarketMonitoring/AnnualQuarterlyReports/Default.aspx>

³ [Calculation of Annual Fuel Cell NEM GHG Emission Standards](https://ww2.arb.ca.gov/sites/default/files/classic/energy/nem/2-13-18/calculate_ghg_emission_std_2-13-18.pdf)
https://ww2.arb.ca.gov/sites/default/files/classic/energy/nem/2-13-18/calculate_ghg_emission_std_2-13-18.pdf

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Where:

$FCNEM_{y+3}$ = FCNEM emission standard for year $y+3$ (kgCO₂e/MWh)

y = Calendar year in which the update is occurring

0.975 = Adjustment to reduce annual GHG emission standard by 2.50 percent

- (4) If in any year $FCNEM_{y+1}$, as calculated per 95412(a)(1), is greater than $FCNEM_y$, $FCNEM_{y+1}$ shall be calculated as follows:

$$FCNEM_{y+1} = FCNEM_y * 0.975$$

Where:

$FCNEM_{y+1}$ = FCNEM emission standard for year $y+1$ (kgCO₂e/MWh)

y = Calendar year in which the update is occurring

0.975 = Adjustment to reduce annual GHG emission standard by 2.50 percent