

WAC 173-407-050 Calculating total carbon dioxide emissions to be mitigated under Part I. (1) Step 1 - Calculate the annual CO₂ emission rate. Calculate the annual CO₂ emission rate using the following formula unless a differing analysis is necessary or appropriate for the electric generating process and type of equipment:

$$CO_{2rate} = \frac{F_s \times K_s}{2204.6} \times T_s + \frac{F_1 \times K_1}{2204.6} \times T_1 + \frac{F_2 \times K_2}{2204.6} \times T_2 + \frac{F_3 \times K_3}{2204.6} \times T_3 \dots + \frac{F_n \times K_n}{2204.6} \times T_n$$

where:

- CO_{2rate} = Annual CO₂ emission rate in metric tons per year
- F₁ to F_n = Maximum design fuel firing rate in MMBtu/hour calculated as manufacturer or designer's guaranteed total net station generating capability in MWe/hour times the new equipment heat rate in MMBtu/MWe. Determined based on higher heating values of fuel
- K₁ to K_n = Fuel to CO₂ conversion factor for the fuel(s) being evaluated in lb CO₂/MMBtu for fuel F₁ to F_n
- T₁ to T_n = Hours per year fuel F₁ to F_n is allowed to be used. The default is 8760 hours unless there is a limitation on hours in an order of approval
- F_s = Maximum design supplemental fuel firing rate in MMBtu/hour, at higher heating value of the fuel
- K_s = Fuel to CO₂ conversion factor for the supplemental fuel being evaluated in lb CO₂/MMBtu for fuel F_s given fuel
- T_s = Hours per year supplemental fuel F_s is allowed. The default is 8760 hours unless there is a limitation on hours in an order of approval

(a) When there are multiple new fossil-fueled electric generating units, the above calculation must be performed for each unit and the annual CO₂ emission rate of all units must be summed.

(b) A unit or facility allowed to use multiple fuels must use the maximum allowed hours on the highest CO₂ producing fuels for each fuel until the total of all hours per fuel add up to the allowable annual hours.

(c) A new unit or facility allowed to use multiple fuels without restriction in its order of approval must perform this calculation assuming that the fuel with the highest CO₂ emission rate is used 100 percent of the time.

(d) When the order of approval restricts the annual operating hours for any reason, the total of T₁ to T_n equals the annual allowable hours of operation in the order of approval.

(e) Fuel to CO₂ conversion factors. For K₁ to K_n and K_s in the formula in subsection (1) of this section, use the CO₂ emission factors for fossil fuels in 40 C.F.R. Part 98, Table C-1 (in effect on the date in WAC 173-407-006), except that the values for nonfossil fuels must be 0.00 lb/MMBtu.

(2) Step 2 - Determine the total carbon dioxide emissions. You must use the following formula to determine total carbon dioxide emissions:

$$\text{Total CO}_2 \text{ Emissions} = \text{CO}_{2\text{rate}} \times 30 \times 0.6$$

where:

- $\text{CO}_{2\text{rate}}$ = Annual CO₂ emission rate in metric tons per year
- 30 = Thirty-year period
- 0.6 = Assumed capacity factor

(3) Step 3 - Determine the cogeneration credit (if any).

(a) Where the cogeneration unit or facility qualifies for cogeneration credit, the cogeneration credit is the annual CO₂ emission rate (in metric tons per year). You must use the following formula or a similar method to determine the annual CO₂ cogeneration credit:

$$\text{CO}_{2\text{credit}} = \frac{H_s}{2204.6} \times (K_a) \div n$$

where:

- $\text{CO}_{2\text{credit}}$ = The annual CO₂ cogeneration credit in metric tons/year
- H_s = Annual heat energy supplied by the cogeneration plant to the "steam host" per the contract or other binding obligation/agreement between the parties in MMBtu/yr as substantiated by an engineering analysis
- K_a = The time weighted fuel to CO₂ conversion factor for the cogeneration plant in lb CO₂/MMBtu supplied. The time weighted average is calculated similarly to the above method described in subsection (1) of this section
- n = Efficiency of new boiler that would provide the same quantity of thermal energy. Assume $n = 0.85$ unless facility provides information supporting a different value

(b) Calculate the metric tons of the cogeneration credit over the thirty-year period.

$$\text{Cogeneration Credit} = \text{CO}_{2\text{credit}} \times 30$$

(4) Step 4 - Determine the mitigation quantity. Determine the CO₂ emissions mitigation quantity using the following formula:

$$\text{Mitigation Quantity} = \text{Total CO}_2 \text{ Emissions} \times 0.2 - \text{Cogeneration Credit}$$

where:

- Mitigation quantity = The total CO₂ emissions to be mitigated in metric tons
- 0.2 = The mitigation factor in RCW 80.70.020(4)

(5) Additional restrictions for a modification to an existing facility not involving installing new generating units. Calculate the

CO₂ mitigation quantity using the method in subsections (1) through (4) of this section with the following restrictions:

(a) The quantity of CO₂ subject to mitigation is limited to the emissions resulting from the modification and does not include the emissions occurring prior to the modification;

(b) An increase in operating hours or other operational limitations established in an order of approval is not an exempt modification under this regulation. However, only emissions related to the increase in operating hours are subject to the CO₂ mitigation program requirements;

(c) The annual CO₂ emission rate (CO₂_{rate}) in subsection (1) of this section is the difference between the premodification condition and the postmodification condition, but using the like new heat rate for the combustion equipment; and

(d) A facility may use a cogeneration credit only if it is a new cogeneration credit established after July 1, 2004.

[Statutory Authority: Chapter 80.70 RCW. WSR 18-05-091 (Order 16-12), § 173-407-050, filed 2/21/18, effective 3/24/18. Statutory Authority: Chapter 80.80 RCW. WSR 08-14-011 (Order 07-11), § 173-407-050, filed 6/19/08, effective 7/20/08. Statutory Authority: RCW 70.94.892 and chapter 80.70 RCW. WSR 05-01-237 (Order 03-09), § 173-407-050, filed 12/22/04, effective 1/22/05.]