

Oregon Carbon Dioxide Emission Standards For New Energy Facilities

Introduction

Rules of the Oregon Energy Facility Siting Council (“Council”) set carbon dioxide (“CO₂”) emissions standards for new energy facilities. The standards apply to base-load gas plants, non-base load power plants, and nongenerating energy facilities that emit CO₂. The Council originally adopted these rules pursuant to HB 3283, which the Oregon Legislature passed in 1997. The Council has subsequently updated the rules, most recently in May 2007. The rules are in Oregon Administrative Rules, Chapter 345, Division 24. Definitions are in Division One.

For base load gas plants and non-base load plants, the standard sets the net emissions rate at 0.675 lb. CO₂ per kilowatt-hour. For nongenerating facilities, the rate is 0.504 lb. CO₂ per horsepower-hour.

The standard for base-load gas plants applies only to natural gas-fired plants. The standards for non-base load plants and nongenerating facilities apply to all fuels. As described below, the rules allow for hybrid (base-load gas plant/non-base load power plant) configurations. The Council has not set CO₂ emissions standards for base-load power plants using other fossil fuels.

The rules are divided into specific standards for each of the three categories of facilities, along with a set of rules for the monetary path for providing offsets. The major differences among the standards are in how the rules account for the capacity factors and variations in the operation of the facilities. Therefore, the discussion will address first how the Council forecasts and tracks the gross and net CO₂ emissions for each of the categories of facilities. Then it will address offset projects and the monetary path.

Note: The following discussion distinguishes between an applicant for a site certificate and a certificate holder. These are stages in the process of building an energy facility. Applicants have to demonstrate that they meet the state’s standards in order for the Council to grant a site certificate. Certificate holders have to comply with the site certificate conditions as they construct and operate their facilities.

Specific Standards for Generating Facilities

Base-Load Gas Plants

The CO₂ emissions standard for base-load, natural gas-fired power plants (“base load gas plant”) is a net emissions rate of 0.675 lb. CO₂/kWh of net electric power output. The Council’s definition of a natural gas-fired facility allows up to 10 percent of the expected annual energy use to be provided by an alternative fuel, most likely distillate fuel.

The law allows the Council to modify the base-load gas plant standard so that the net emissions rate remains 17 percent below the most efficient base-load gas plant operating in the US. The statute specifies principles the Council must consider and balance in changing the standard.

When the Council last modified the CO₂ standard, the most efficient base-load plant then operating had a heat rate of 6,955 Btu/kWh (HHV) with an emission rate of 0.81 lbs. CO₂/kWh.

Applicants for a site certificate will most likely propose a plant that has a lower heat rate, i.e. a more efficient plant. Such a plant will go partway in meeting the standard, but manufacturers do not offer technologies that could meet the standard solely through efficiency. To meet the standard through efficiency alone, a natural gas-fired turbine would have to have a heat rate of about 5,770 Btu/kWh (HHV).

Non-Base Load Power Plants

The CO₂ emissions standard for a non-base load power plant, regardless of fuel, is a net emissions rate of 0.675 lb. CO₂/kWh of net electric power output. Because non-base load power plants are likely to use single-cycle turbines, the standard is about 40 to 45 percent below such plants currently in operation, if they are using natural gas. The rules call for a revised standard to be equivalent to the standard for a base-load gas plant, subject to the statutory principles the Council must consider and balance in setting the standard.

Power Augmentation

The Council's rules allow for a base-load gas plant with power augmentation to meet separate standards for the two modes of operation. The rule applies only to power augmentation that both increases the capacity and the heat rate of the plant, such as duct burning. The base-load operation must meet the base-load gas plant standard, and the power augmentation operation must meet the non-base load standard. Therefore, the Council treats these plants as hybrid plants.

The Council rules account for technologies that allow a base-load gas plant to be operated in a base-load manner under usual conditions, but that also allow it to increase capacity for short periods to meeting peaking requirements. There are two major differences between the rules for the two types of plants: the annual hours of operation, and one-time versus periodic reporting requirements. These are explained below.

Forecasting and Tracking CO₂ Emissions

The rules account for the different operational characteristics of base-load and non-base load plants. Non-base load plants are peaking, or load-following, plants.

Base-Load Gas Plants without Power Augmentation

If the base load gas plant does not employ power augmentation technologies, the Council determines the gross CO₂ emissions that are reasonably likely to result from the operation of the facility based on the proposed design of the facility. The Council calculates gross CO₂ emissions by assuming a 100 percent capacity factor and a 30-year life of the plant, as specified in statute. Other than the single test on a new and clean basis, described below, the Council does not track the actual emissions of the operating plant.

Base-Load Gas Plants with Power Augmentation

If a base load gas plant employs power augmentation technologies, the Council determines the gross CO₂ emissions in an additive fashion for simplicity. It calculates gross CO₂ emissions by assuming a 100 percent capacity factor and a 30-year life of the plant for the number of hours the plant is not using power augmentation, which is the base-load element. It adds those emissions to the emissions it calculates for the hours when the plant is using power augmentation for a total of 8,760 hours annually.

Non-Base Load Power Plants/Power Augmentation

The Council determines the gross CO₂ emissions that are reasonably likely to result from the operation of the facility based on the proposed design of the facility and the average annual hours of operation. The applicant specifies the annual hours it proposes to operate.

The rules define a non-base load plant as a fossil-fuel generating facility that is limited by the site certificate to an average of not more than 6,600 hours of operation annually. This is a 75 percent capacity factor. The rules treat a facility that would operate more than 6,600 hours annually on average as a base-load plant at 100 percent capacity.

As with base-load gas plants, the rules specify a 30-year analysis period for determining gross emissions, unless an applicant requests a shorter operational life for the facility. The rules require testing on a new and clean basis during the first year of operation, but allow modifications to the testing procedure for technical and operational considerations. The rules require that the results be adjusted for average local conditions during the times of the year when the facility intends to operate.

The rules provide a check on the actual operation of the non-base load power plants to ensure that they meet the limitations on their hours of operation. Every five years after the plant begins operation, the certificate holder must report to the Council its actual hours of operation.

If the actual emissions, calculated using the hours of operation and the heat rate on a new and clean basis, exceed the projected emissions prorated for a 5-year period, the certificate holder must offset the excess emissions using the monetary path. The rules apply the present value of the monetary path offset rate of the year in which the Council first granted the site certificate. If the certificate holder has not emitted CO₂ equal to the prorated amount in previous 5-year periods, the Council will credit the certificate holder with the “unused” emissions to determine the net amount of excess emissions the certificate holder must possibly offset in future reporting periods.

In addition to requiring the certificate holder to offset excess emissions from previous operations, the rules require the Council to recalculate the projected emissions for the facility based on the average hours of operation during the 5-year period in which it exceeded its limitation on hours of operation. The Council will project emissions for the years remaining in the deemed 30-year life of the plant. The certificate holder must also offset these additional projected emissions at the present value of the monetary path offset rate. The rules look only at the previous 5-year period when calculating future excess emissions. There is no credit for earlier 5-year periods in which the plant may not have operated at the full capacity allowed by the site certificate when the Council is estimating future emissions.

The purpose of these rules is to remove an incentive for an applicant to propose fewer hours of operation than are likely to occur in order to avoid having to provide all offsets prior to beginning construction, especially if the plant will actually operate as a base-load power plant. If the average annual hours of operation ever exceed 6,600, the rules require the Council to treat the facility as a base-load plant operating 8,760 hours annually for the remainder of the 30 years.

New and Clean Basis

The Council will specify site certificate conditions to ensure that a generating plant does not exceed the predicted CO₂ emissions on a “new and clean basis.” The rules define the phrase “new and clean basis,” including test conditions and flexibility of testing procedures. The rules require a 100-hour test that the facility must conduct during its first year of operation. The rules also allow the commercial acceptance test to meet this requirement. If the facility fails to meet the predicted CO₂ emissions rate, the certificate holder must offset the excess emissions. The rules allow flexibility of the testing procedure for the new and clean basis for non-base load plants or power augmentation.

Flexibility

While the Council determines compliance with the CO₂ standard based on the proposed design of the facility, it may be years before the facility is built. The rules give certificate holder flexibility in selecting equipment and defining certain operational parameters at the time it decides to build the facility. The rules allow a certificate holder to certify the final heat rate and capacity of the facility based on its contract with suppliers. The certificate holder can vary these elements within limits specified in the rules and the site certificate.

Reducing CO₂ Emissions Through Cogeneration

An applicant for a generating facility may meet the standard through cogeneration that will offset fossil fuel emissions that would have otherwise occurred. It is possible for an applicant to meet offset all its excess CO₂ emissions through cogeneration offsets alone.

The Council will evaluate the CO₂ emissions reductions from cogeneration and make its own determination of the likely reductions over 30 years. If it is crediting an applicant with CO₂ offsets from cogeneration, the Council must adopt site certificate conditions that guarantee the certificate holder provides the projected emission reductions.

Specific Standards for Nongenerating Facilities

The rules set a standard for nongenerating energy facilities that emit CO₂. While there are a number of types of nongenerating facilities that fall under the Council's jurisdiction, the most likely application of this standard will be for compressors at underground natural gas storage facilities. Therefore, the standard is expressed as a rate of emissions per horsepower hour: 0.504 lb. CO₂/hp-hr. This is equivalent to the power plant standard of 0.675 lb. CO₂/kWh.

The Council estimates the total CO₂ emissions from the facility in order to determine the appropriate schedule for increments of emission offsets that the certificate holder should provide. To account for the high variability in the workload of a compressor, the rules do not require the certificate holder to provide offsets according to a one-time estimate of gross CO₂ emissions. The rules also allow the Council to determine that the life of the facility may be less than 30 years.

The certificate holder must provide a certain amount of offsets in advance to an offset credit account and then draw down its credit based on actual emissions. The Council sets the schedule for providing offsets by considering the potential gross emissions and the need to provide offsets in amounts sufficient to develop effective offset projects.

The Council may require the certificate holder to provide offsets in any increment of the estimated total offsets needed. In any case, before the account is exhausted, the certificate holder must replenish it with additional offsets up until the end of the analysis period. The applicable offset rate would be the present value of the offset rate in effect on the date the Council issued the site certificate.

Summary

Base-load gas plant:

Net emissions rate: 0.675 lb. CO₂/kWh, with verification of emissions rate during first year of operation.
Annual hours of operation: 8,760 hours (100 % capacity).
Time-frame for analysis: 30 years.

Non-base load power plant:

Net emissions rate: 0.675 lb. CO₂/kWh for all fuels, with verification of emissions rate during first year of operation and accounting every five years for emissions based on reported hours of operation and the new and clean emissions rate.
Annual hours of operation : Up to 6,600 hours (75 % capacity).
Time-frame for analysis: 30 years.

Nongenerating energy facilities:

Net emissions rate: 0.504 lb. CO₂/horsepower-hour.
Annual hours of operation : Not applicable. The Energy Facility Siting Council specifies the amount of offsets the certificate holder must provide to an offset credit account prior to beginning construction, then the certificate holder replenishes the offset credit account based on actual emissions as directed by the Council.
Time-frame for analysis: 30 years, unless the Council specifies a shorter period.

Reducing CO₂ Emissions Through Offset Projects

An applicant has two alternatives for meeting a CO₂ standard through offset projects:

- 1) it may implement projects directly or through a third party; or,
- 2) it may use the “monetary path.”

The statute defines an offset as an action that will be implemented by the applicant, a third party, or a qualified organization to avoid, sequester or displace CO₂ emissions. The future tense of the definition limits offsets to new projects. There are no limitations on the geographic location or types of CO₂ offset projects.

Applicant-Sponsored Offset Projects

An applicant may propose offset projects that it or a third party on contract to it will implement. The Council must determine the quantity of CO₂ emission reductions reasonably likely to occur from each project. To do so, the Council must consider:

- 1) the certainty that the projected offsets will be achieved;
- 2) the ability of the Council to determine what reductions resulted from the projects, based on the monitoring and evaluation the applicant proposes; and,
- 3) the extent to which the CO₂ reductions would have occurred in the absence of the offset project.

The rules specify the information that an applicant must provide. They also provide specific criteria the Council must consider and the findings that the Council must make in order to determine that a proposed offset project meets the standard.

The Council's evaluation will most likely take place as part of a quasi-judicial, contested-case proceeding, which is part of the process for reviewing every application for a site certificate. The Council will adopt site certificate conditions to ensure that the proposed projects are implemented; however, it may not require that the applicant guarantee that it will achieve the predicted CO₂ offsets from these projects. The rules require that a site certificate holder must begin to implement its offset project(s) before beginning construction.

The statute prohibits the Council from allowing credit for offsets that have already been allocated or have been awarded CO₂ reduction credits in another regulatory setting. Neither the law nor the rules specifically addresses carbon trading. Nevertheless, a certificate holder cannot trade the CO₂ offsets that the Council requires it to provide to meet the CO₂ standard. The Council holds in trust the CO₂ offsets that the certificate holder provides in order to meet the CO₂ standard.

Monetary Path

Applicants may elect to pay a deemed amount per ton of CO₂ as a way to meet the standard. The amount is \$1.27 per short ton of CO₂. The Council last set the monetary offset rate in May 2007. After two years, it may again adjust the offset fund rate based on empirical evidence of the cost of CO₂ offsets and its finding that meeting the standard through the monetary path will be economically achievable for natural gas-fired power plants. However, it may not adjust the rate more than 50 percent in either direction during any two-year period.

If an applicant elects to use the monetary path, the Council will determine the amount of reductions required to meet the standard and calculate the amount of offset funds the certificate holder must provide to a qualified organization. The certificate holder must provide a bond or letter of credit for the required amount before commencing construction. The rules require the bond or letter of credit to equal the present value of the offset fund rate in effect at the time the Council granted the site certificate.

When the certificate holder has provided the amount of funds specified in the site certificate conditions in the manner required, it will have fulfilled its obligation to meet the CO₂ standard. The monetary path allows an applicant to avoid having to go through a contested case to prove the projected CO₂ offsets from specific projects. It gives it certainty about what it will cost the applicant to meet the standard; and, it allows the certificate holder to avoid having to develop and manage offset projects itself.

Site Certificate Holder's Financial Responsibilities under the Monetary Path

The certificate holder is responsible for two types of payments under the monetary path:

- 1) the "offset funds," at \$1.27 per short ton of excess CO₂ emissions; and,
- 2) selection and contracting funds.

The selection and contracting funds are equal to 10 percent of the first \$500,000 of offset funds and 4.286 percent of any offset funds in addition to \$500,000. A base-load gas plant must pay a minimum of \$50,000 unless the Council specifies a lesser minimum. On smaller projects or for additional payments, it has been the Council's practice to require 20 percent of the first \$250,000 of offset funds and 4.286 percent of any greater amount.

The selection and contracting funds compensate the qualified organization for its cost of selecting and contracting for the implementation of offsets. The qualified organization may use these funds to purchase offsets as well as perform administrative functions. These funds are additional to the offset funds because the certificate holder would have incurred them itself had it implemented its own projects.

It is the Council's practice to specify in the site certificate how a certificate holder must disburse funds to a qualified organization. The certificate holder must pay the administrative funds to the qualified organization prior beginning construction. The certificate holder must pay the total offset funds the qualified organization request when it notifies the certificate holder that it has a contract to implement an offset project. Once a certificate holder has provided offset funds, the rules do not permit a refund.

Use of Offset Funds

The qualified organization must use at least 80 percent of the offset funds for contracts to implement offsets directly. The rules define offsets as any action that will avoid, sequester, or displace CO₂ emissions. The qualified organization may use up to 20 percent of offset funds for monitoring, evaluation, administration, and enforcement of contracts to implement offsets. The rules also require a qualified organization to obtain the offsets in a timely manner and regularly to report its activities to the Council.

Qualified Organization

The monetary path relies on a qualified organization for its implementation. The rules set the criteria for an independent, non-profit organization that may administer the monetary path. Neither the statute nor the rules name or establish a specific organization.

To qualify, an organization must meet several criteria, including that it be exempt from federal taxation under section 501(c)(3) of the Internal Revenue Code and that an independent decision-making body, in this case the board of directors, have three members appointed by the Council, three appointed by an environmental non-profit organization, and one member appointed by applicants for site certificates subject to this law. A certificate holders who has provided funds

to the qualified organization holds a non-voting seat on the board while the qualified organization is selecting and contracting for projects with the certificate holder's funds.

The Climate Trust

The Climate Trust has been created independently as the only qualified organization. It was formed in accordance with the criteria in the law to serve as a qualified organization. Its board membership meets the requirements of the law. It is incorporated in Oregon and has federal non-profit 501(c)(3) tax status.

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