



# Assessment of Potential Sources of Offsets for Outer Continental Shelf (OCS) Projects

August 11, 2023

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## MEMORANDUM

**TO:** Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency

**FROM:** Matt Haber and Steve Rapp, Eastern Research Group, Inc. (ERG)

**DATE:** August 11, 2023

**SUBJECT:** Assessment of Potential Sources of Offsets for Outer Continental Shelf (OCS) Projects

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### 1. BACKGROUND AND GENERAL OFFSET REQUIREMENTS

This memorandum provides a summary of a subset of state and local programs' offset requirements and shows possible opportunities for generating nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) offsets for Nonattainment New Source Review (NNSR) permitting. These potential sources of offsets could be considered when drafting Outer Continental Shelf (OCS) air permits<sup>1</sup> that need to show compliance with NNSR requirements. This assessment includes examples of options that other states have undertaken to generate offsets that meet the Environmental Protection Agency's (EPA) NNSR offsets requirements. This memo is a deliverable under EPA Contract EP-W-15-011 Work Assignment 5-03.

Since the 1970s, the Clean Air Act (CAA or the Act) and EPA policy<sup>2</sup> have required offsets when major sources of air pollution in areas not in attainment of the National Ambient Air Quality Standards (NAAQS)<sup>3</sup> construct or increase emissions by more than a certain amount. Offsets are emissions reductions beyond those otherwise required by law and regulation—thus, the offsets mitigate the impact of major source construction that cannot be anticipated by the Attainment Plan<sup>4</sup> for the area. The 1990 CAA Amendments in section 173 of the Act, further codified the offset requirement that had been established by the 1977 CAA Amendments. Specific offset ratios were added for ozone precursors<sup>5</sup> in section 181; for other pollutants, the general requirement is that offsets must provide a “net air quality benefit.”

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<sup>1</sup> An OCS air permit is a permit issued to a source located in the Outer Continental Shelf. An OCS permit can include various CAA requirements such as New Source Review (NSR) Permitting, Title V permitting, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP) and state and local requirements as applicable.

<sup>2</sup> See U.S. EPA, 2001. Economic Incentive Guidance, <https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=2000EGLT.pdf>.

<sup>3</sup> EPA has established NAAQS for six air pollutants and its precursors: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Particulate Matter (PM) and Sulfur Dioxide (SO<sub>2</sub>).

<sup>4</sup> An attainment plan is a CAA requirement to reduce emissions to ensure that the health-based NAAQS will be met, by a certain deadline, after an area is designated as not attaining the NAAQS.

<sup>5</sup> A precursor is an air pollutant directly emitted to the atmosphere that is a component of another pollutant that is wholly or partially formed in the atmosphere.

The EPA has provided guidance on specific requirements that any offset must meet<sup>6,7</sup>. There are four key offset requirements. Any offset must be:

- **Surplus.** Emission reductions may be surplus if they are not otherwise relied on in air quality-related programs related to the State Implementation Plan (SIP)<sup>8</sup>, SIP-related requirements, other State air quality programs adopted but not in the SIP, a consent decree, or Federal rules that focus on reducing criteria pollutants or their precursors (including maximum achievable control technology [MACT<sup>9</sup>]) rules that directly or incidentally reduce criteria pollutants<sup>10,11</sup>).
- **Enforceable**<sup>12</sup>:
  - They are independently verifiable.
  - Program violations are defined.
  - Those liable can be identified.
  - The relevant air agency and the EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable.
  - Citizens have access to all the emissions-related information obtained from the source.
  - Citizens can file suits against sources for violations.
  - They are practicably enforceable<sup>13</sup> in accordance with other EPA guidance on practicable enforceability.
- **Quantifiable.** Emissions and emission reductions are quantifiable if they can be replicated and reliably measured or determined.<sup>14</sup> In general, offsets created by stationary source shutdowns or overcontrol are quantified based on source test data, continuous emissions monitoring system (CEMS) data, fuel use records, throughput, and in some cases, if no other data are available, emission factors.

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<sup>6</sup> U.S. EPA Emissions Trading Policy Statement, found at <https://cdn.loc.gov/service/ll/fedreg/fr051/fr051233/fr051233.pdf>

<sup>7</sup> U.S. EPA, 2001. Economic Incentive Guidance, found at <https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockkey=2000EGLT.pdf>.

<sup>8</sup> A SIP is a collection of regulations and documents used by a state, territory, or local air district to implement, maintain, and enforce the NAAQS, or to fulfill other requirements of the CAA.

<sup>9</sup> MACT standards are performance criteria designed to significantly reduce air toxics emissions.

<sup>10</sup> Those pollutants for which NAAQS have been established are also known as “criteria air pollutants.” EPA calls these pollutants criteria pollutants because EPA sets NAAQS on then based on various criteria, which are characterizations of the latest scientific information regarding their effects on health and welfare. Information at: <https://www.epa.gov/criteria-air-pollutants>. The term “criteria pollutant” also comes from the “criteria document” that the EPA’s Science Advisory Board creates, containing information for EPA management consideration in setting the level of the standard. See, [https://cfpub.epa.gov/si/si\\_public\\_record\\_Report.cfm?Lab=NCEA&dirEntryID=32647](https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=NCEA&dirEntryID=32647).

<sup>11</sup> Paraphrased from EPA’s *Economic Incentive Guidance* (U.S. EPA, 2001).

<sup>12</sup> See Footnote 2.

<sup>13</sup> Enforceable as a Practical Matter means that an emission limitation or other standard is both legally and practicably enforceable. An emission limitation or other standard is legally enforceable if the reviewing authority has the right to enforce it. Practical enforceability for an emission limitation or for other standards (design standards, equipment standards, work practices, operational standards, pollution prevention techniques) in a permit for a source is achieved if the permit’s provisions specify: (i) A limitation or standard and the emissions units or activities at the source subject to the limitation or standard; (ii) The time period for the limitation or standard (e.g., hourly, daily, monthly and/or annual limits such as rolling annual limits) and (iii) The method to determine compliance, including appropriate monitoring, recordkeeping, reporting and testing.

<sup>14</sup> See Footnote 2.

- **Permanent.** Emissions reductions for stationary sources are treated as permanent if there is an enforceable limit placed in a federally enforceable<sup>15</sup> permit for that source (U.S. EPA, 1986). For emissions reductions created by mobile sources, reductions are permanent if those reductions persist at least for the life of the new source. In practice, that life has generally been assumed to be 30 years.<sup>16</sup>

Some agencies have added the term “real” as a fifth requirement. In addition to the plain language meaning, some explicitly use that term to prohibit use of shutdowns by inelastic demand sources (e.g., dry cleaners or gas stations), because shutdown of one such source will simply lead to increased use at another, nearby source of the same type.

## 1.1 “Traditional” Offset Options

Historically, most offsets have come from stationary sources. For example, offsets have been generated from controlling existing stationary sources beyond current regulatory requirements, or from shutdowns of existing stationary sources. EPA has limited the use of “prior” shutdowns (i.e., those that occurred before the application for the new source has been submitted) in situations where an area is required to, but does not have an approved attainment demonstration.<sup>17</sup> EPA’s reasoning is that in those cases where there is not a nexus between a new proposed source and a shutdown of an existing source, it is difficult to distinguish whether the emissions from the shutdown source will be used to demonstrate progress toward attainment, or whether they will be reserved for use by a new or modified source.<sup>18</sup>

Overcontrol of existing sources can be a source of offsets, particularly in areas with less severe attainment problems. In those cases, there may be a significant delta between the existing rule requirements in the SIP (for example, Reasonably Achievable Control Technology (RACT)<sup>19</sup> rules) and those in place (and, therefore, well demonstrated as being technically feasible in retrofit situations) in areas with more severe attainment problems. In addition, since any particular transaction is wholly between private parties, the field is ripe for innovation beyond currently demonstrated technologies. Thus, these offset transactions have the potential to drive technology advancement.

As described in Appendix B below, of the 11 states reviewed [Connecticut (CT), District of Columbia (DC), Delaware (DE), Massachusetts (MA), Maine (ME), Maryland (MD), New Hampshire (NH), New Jersey (NJ), New York (NY), Pennsylvania (PA), and Rhode Island (RI)], all but DC have regulations that explicitly discuss offset trading. Some states have separate offset or credit banking and trading regulations, such as DE, MA, NH, and NY. Some states, such as CT, MA, MD, NH, NY, NJ, and PA, have formal offset or credit banks where the emissions reductions that have gone through a formal process to quantify the amount that is surplus, ensure the reduction is permanent, and make it enforceable are documented,

<sup>15</sup> Federally Enforceable is defined as: “all limitations and conditions which are enforceable by the Administrator, including those requirements developed pursuant to [40 CFR parts 60 and 61](#), requirements within any applicable State implementation plan, any permit requirements established pursuant to [40 CFR 52.21](#) or under regulations approved pursuant to [40 CFR part 51, subpart I](#), including operating permits issued under an EPA-approved program that is incorporated into the State implementation plan and expressly requires adherence to any permit issued under such program.” See 40 C.F.R. 52.21 (b)(17).

<sup>16</sup> Discrete Emissions Reductions (DERs), which are not permanent, may be used as new source review (NSR) offsets in certain circumstances. See, e.g., EIP Guidance, page 121 (U.S. EPA, 1998).

<sup>17</sup> An attainment demonstration includes modeling and other methodologies to show that the methods a state has proposed will meet the NAAQS by the relevant deadline. Attainment demonstrations are a necessary part of a full nonattainment plan; however, there are other critical components. See, <https://www.epa.gov/scram/state-implementation-plan-sip-attainment-demonstration-guidance>

<sup>18</sup> See, Seitz memo, Use of Shutdown Credits for Offset, (U.S. EPA, 1993).

<sup>19</sup> RACT is pollution control technology that is reasonably available and feasible technologically and economically. It is usually required on existing sources in areas that are not attaining the NAAQS.

tabulated, and made available to the public. Some banking programs are approved into the SIP; for those programs, trades made pursuant to those rules may meet federal enforceability and public participation requirements. Other rules are not in the SIP, but the state's registries serve an important function by making clear to the public, and especially project developers, what offsets may be available for use for a new or modified source.

As shown in Appendix B, there is variability to the types of credits in the registries. Some states also differentiate between ozone and non-ozone season credits. Some of the registries appear to have large numbers of available credits, but the use of offset credits must match the "equal non-attainment classification or higher" rules, which limits the available credits in states or areas within a state that have the highest level of non-attainment (e.g., "severe" or "serious"). States with areas in different ozone non-attainment status separate credits from attainment areas and non-attainment areas with different classifications. Similarly, several states explicitly allow inter-state trading but require memoranda of understanding (MOUs) with states or add other restrictions, such as distance discount factors or special legal authorities. Other states appear to allow interstate or inter-area trading as long as credits come from an area with equal or higher ozone non-attainment classification, or the transaction can be shown to have a net air quality benefit. Several states, such as MD, ME, and NH, have historically allowed inter-precursor credit trading (e.g., NO<sub>x</sub> for VOC), but, as discussed below, such trading is not currently allowed. Most of the states appear to allow offset credits generated from non-stationary sources, e.g., over-control of mobile sources, provided the creation of the credits have been approved in the SIP (i.e., SIP-approved).

Most traditional offsets are made enforceable via a federally enforceable permit (typically a pre-construction permit, or an operating permit via a SIP-approved operating permit program). For offsets created via additional emissions controls, the new level of allowable emissions, the control technology associated with the reduced emissions, as well as appropriate monitoring, recordkeeping and reporting requirements will become permit requirements. For offsets created via a source or emissions unit shutdown, the applicable permit will either be revoked, or a provision will be added to the permit preventing any future operation of the subject emissions units.

In some situations, a permit mechanism may not be available (for example, if the offsets come from sources that are exempt from permitting). In those cases, States have chosen a variety of mechanisms to ensure enforceability. The two most common mechanisms are source specific SIP revisions and subjecting an otherwise exempt source to permitting. For a source-specific SIP revision, a State will adopt a rule using its established rulemaking process that is specific to the source providing the offsets. Once adopted, the rule is submitted to the EPA, and subsequently is approved as part of the SIP. On the other hand, legal analysis is required prior to allowing a source that is otherwise exempt from the permit requirement to obtain a permit. Legal counsel will need to determine and document that the overarching language in the rule that exempts the source from permitting does not trump the enforceability of the permit that a source has voluntarily subjected itself to. Some States solve this dilemma by expressly including rule language that allows otherwise exempt sources to subject themselves to permitting for specific reasons.

Offset availability may be limited in the existing banks in the New England states. For example, at the time of this writing, there are a total of 271 tons of NO<sub>x</sub> emissions shown as banked credits in the Massachusetts bank. ERG has explored a number of options for creating creditable offsets, with a focus on NO<sub>x</sub> offsets. In the "traditional" offset category, we briefly explored the potential for overcontrol at stationary sources that make up a significant part of the Massachusetts NO<sub>x</sub> inventory. We then assessed one available level of additional emissions control to determine the approximate category wide potential for offsets.

ERG reviewed the stationary source inventory for the State of Massachusetts to identify potential sources. Based on the inventory, gas turbines are a significant emitter of NO<sub>x</sub><sup>20</sup>. Moreover, there is a significant difference between the generally required emissions level in the Massachusetts rules and what is currently technically feasible for that source category. ERG calculated the potential available reductions for the entire source category and determined the reductions potentially available based on South Coast Air Quality Management District (SCAQMD) rule 1135.<sup>21</sup> Based on this simple assessment, about 1,979 tons/year<sup>22</sup> would be available by implementing additional controls at these sources. See Appendix A for details of ERG's assessment.

A similar process could be followed to assess offset potential for other source categories in MA or other states.

## 1.2 Inter-Precursor Offsets

There are a number of air pollutants where the pollutant subject to the NAAQS is wholly or partly formed in the atmosphere, rather than directly emitted. The directly emitted pollutants are known as precursors to the secondary pollutants formed in the atmosphere. These precursors include NO<sub>x</sub>, which reacts to form NO<sub>2</sub>; VOCs and NO<sub>x</sub> which react to form ozone; and VOCs, NO<sub>x</sub>, and SO<sub>2</sub>, which form PM<sub>2.5</sub>. EPA issued a guidance document<sup>23</sup> to explain how the correct ratio for inter-precursors for ozone (i.e., NO<sub>x</sub> and VOC) should be calculated. However, on January 29, 2021, the D.C Circuit Court vacated the ozone inter-precursor trading program.<sup>24</sup> Inter-precursor trading for ozone precursors is therefore not an option at this time and in the future.

## 1.3 Offsets Generated from Mobile Sources

As discussed above, most offsets created and used to date have come from stationary source emission reductions either resulting from the shutdown of all or part of a stationary source<sup>25</sup>, or from installation of emissions controls that create reductions greater than those required by regulatory requirements. As air emissions from stationary sources have been more tightly controlled, and in areas without a large stationary source population, interest has been expressed in creating offsets through the control of mobile source air emissions due to the scarcity of "traditional" stationary source offsets. Back in 1986, EPA addressed the notion of mobile source Emission Reduction Credits (ERCs) saying that mobile source offsets would always require a source-specific SIP revision.

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<sup>20</sup> See Appendix A. Electricity Generation, consisting largely of emissions from gas turbines, is the second largest source category in the Massachusetts stationary source inventory.

<sup>21</sup> As this was a screening analysis, ERG used this rule as a basis, since, by establishing the rule, SCAQMD determined that it is achievable for all existing sources. Greater reductions may be achievable by implementing more rigorous levels of established emissions control technology, or by using a new technology that achieves emissions levels lower than current technology has achieved.

<sup>22</sup> As we note in Appendix A, our analysis was based on the 2017 NEI, and excluded several sources that have been or are planned to be shut down. The electricity generated from those shut down sources would have to be (at least in part) made up from generation at other facilities, which may include other sources in the inventory, sources outside the state, and non-emitting sources. In addition, a regulatory offset calculation would need to be based on the past two years of emissions, rather than 2017 or earlier. Therefore, this estimate may be higher or lower than the actual emissions that would be available at any point in time.

<sup>23</sup> EPA, 2018 (see reference document, IPT.pdf)

<sup>24</sup> Reference to DC decision, (see reference document, 15-1465.pdf) found at <https://www.cadc.uscourts.gov/internet/opinions.nsf/E1C93F2FFC207CD78525866C00535661/%24file/15-1465.pdf>

<sup>25</sup> EPA had concerns as to whether shutdowns were surplus or already built into emissions inventory projections. See discussion in ETPS (U.S. EPA, 1986).

EPA's concerns, and the possible solutions to those concerns, relate to the way mobile sources of offsets are different from stationary source offsets relative to the offset criteria. We discuss these concerns as they relate to each of the offset criteria below.

### **1.3.1 Surplus**

Creation of surplus emissions reductions by stationary sources requires that the reduction must be greater than any SIP requirement that applies to the source generating the offset at the time the offset is used. In general, those requirements are those rules adopted by the State or local agency and approved into the SIP; they may also be MACT rules, and in limited circumstances, New Source Performance Standard (NSPS) or 111(d) rules. In addition, new sources will require a source specific permit prior to construction, and major sources and modifications will require offsets, if they are built in a nonattainment area.

On the other hand, most mobile sources are regulated at the time of manufacture (or, in the case of locomotives, and certain ships, also at the time of major overhaul). So, an individual engine is typically not subject to SIP based retrofit requirements. That is because, in part, the EPA assumes that the mobile source population will, on average, be replaced by new units, on a schedule that is based on the characteristics of that mobile source category. Therefore, any reduction must, in general, be beyond any published standard for reductions in that category to be surplus. In addition, it is necessary to ensure that any mobile source activity that is being considered for emissions reductions is considered in the inventory with an appropriate level of specificity. For example, if truck stop electrification is being considered as a potential source of offsets, the inventory should also include baseline emissions from truck stops.

Furthermore, the determination of whether a reduction is surplus must occur when the offset is used, rather than when it is created (i.e., when the final permit for a new or modified source subject to offsets is issued). This factor may be important when considering the creation of offsets from mobile sources, and EPA recently finalized rules for on-road heavy duty diesel trucks.<sup>26</sup>

### **1.3.2 Quantifiable**

In moving from the use of stationary source offsets to mobile source offsets, the simplest cases involve emissions reductions from a small number of large emitters where source specific emissions data is often reasonable to obtain. In addition, records relating to the duty cycle, frequency and type of use, and fuel data will be readily available. As the number of units increases relative to the amount of emissions offsets that can be obtained per unit (for example, locomotives compared to forklift engines), the need to gather aggregated data increases. Emissions factors, duty cycles, and fuel use will often be available at the fleet level, but not at the individual engine level. Depending on the degree of uncertainty (both based on that demonstrated by data, as well as that suggested by missing data), it may be necessary to discount the credits, or prohibit the use of credits from certain source categories that are too uncertain (TCEQ, 2016). For new engines, the quantification methodology has typically been based on the certification level required by EPA's mobile source rules. Any such calculation should also consider the fact that certified level of emissions control in EPA's mobile source rules is required for a fixed lifetime (which may be based on miles traveled or hours of engine operation). If that period does not match the lifetime of the stationary source, further adjustments may be needed.

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<sup>26</sup> More information on EPA's December 2022 Final Rule and Related Materials for Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards is available at <https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-and-related-materials-control-air-pollution>.



### **1.3.3 Enforceable**

For a stationary source, if the emissions reduction credit results from a shutdown, removing any legal ability for the unit to operate, typically by revoking any relevant permits, provides enforceability. In the case of overcontrol<sup>27</sup>, enforceability is created when the permitting authority imposes permit terms and conditions requiring installation and operation of controls at a specified level in a federally enforceable permit.

For mobile sources, which are not usually subject to permitting by the local permitting authority, the mechanisms available to make reductions federally enforceable are more complex. However, one way to create enforceability is by imposing conditions that ensure that the mobile source engines or vehicles being replaced will be operated in the manner assumed in the ERC analysis that was developed to determine how many emissions reduction credits are available<sup>28</sup>. If the generator of the credits fails in its obligations to reduce emissions going forward, the permitting authority, the EPA, and the public needs to be able to ensure that action can be taken. This problem has generally been addressed by placing the compliance responsibility on the user of the credits. For example, SDAPCD's Rule 27(f) allows the District to invalidate a Mobile Emission Reduction Credit (MERC) if the generator has not complied with the terms of a MERC certificate, which includes monitoring and record keeping requirements. If a MERC has been invalidated, then the user of the MERC is also likely in violation of its permit, and therefore subject to enforcement by the permitting authority, the EPA, or citizens.

### **1.3.4 Permanent**

Mobile sources have operating lives that are typically shorter than those of stationary sources. In contrast, stationary sources have often been assumed to have a lifetime of 30 years. The lifetime of fossil fuel-powered mobile equipment varies, but may be as short as a few years, or in rare cases, such as marine vessels or locomotives, may extend to a similar period as stationary sources. For sources with shorter lifetimes, SDAPCD Rule 27.1(e) provides that replacement engines must be at least as clean as those they replace. In mixed fleet operations (i.e., where not all engines in a fleet or in a location are replaced with cleaner engines), provisions should be made to ensure that load is not shifted to the dirtier portion of the fleet.

## **2. CASE STUDIES**

### **2.1 Case Study: SDAPCD Mobile Emission Reduction Credit (MERC) Program**

The SDAPCD has an active MERC program to generate ERCs for use as offsets by stationary sources. Rule 27.1 (for federal new source review [NSR] compliance) contains requirements for generation of ERCs from replacement of existing medium heavy-duty (MHD) diesel vehicles with new MHD vehicles that are fueled with gaseous fuel, replacement of existing heavy heavy-duty (HHD) diesel vehicles in refuse collection applications with new HHD vehicles that are dual-fueled or fueled with gaseous fuel, and repowering of diesel powered marine vessels with new engines that are fueled with diesel or an alternative clean fuel. Rule 27.1 was used by Calpine's Otay Mesa Energy Facility to create ERCs used to offset operation of their new power plant.

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<sup>27</sup> Overcontrol means creating greater emissions reductions than required by the SIP rule. Those emissions reductions may be achieved by installing additional emissions control equipment, or by running existing emissions control equipment in a way so that it is more effective in reducing emissions.

<sup>28</sup> See, for example, San Diego Air Pollution Control District [SDAPCD] Rule 27.1(f) [SDAPCD, 1994; SDAPCD, 2008]).

Important lessons learned from the San Diego program as summarized by SDAPCD staff<sup>29</sup> are the need for:

- Involving the appropriate EPA Region in the planning of the program to help ensure that a federally enforceable program can be developed for NSR compliance;
- Developing an appropriate approach for determining and monitoring lifetime of the mobile source credits;
- Preventing displacement of clean replacement vehicles/engines with more polluting technologies (i.e., if a truck with a clean engine is relocated outside of the nonattainment area and replaced with a truck with an older, diesel engine);
- Managing disposal of the replacement trucks/engines with the retrofits take place (i.e., should the older engines be destroyed, moved outside of the nonattainment area [NAA] for sale, etc.); and
- Controlling the cost of the ERCs generated by a MERC program, as these credits can be quite expensive. Note that the San Diego program was developed with a specific stationary source as the purchaser of the MERCs, and that source funded the retrofits of the refuse trucks. SDAPCD estimates that the nitrogen oxide (NO<sub>x</sub>) credits created by this program cost from \$100,000/ton (for marine vessel retrofits/replacements) to \$200,000 to \$300,000/ton (for refuse truck replacements).

Regarding replacement of a vehicle that itself was a replacement under the SDAPCD MERC program, SDAPCD Rule 27.1(e) requires that the replacement or repowered mobile source must have an emission factor that is less than or equal to the smaller of the following two emission factors:

1. The most stringent emission factor derived from any federal or California standard applicable to a new engine for the model year corresponding to the date of the replacement of the engine powering the replacement or repowered mobile source; or
2. The emission factor of the mobile source that is replaced or repowered.

Regarding the specified lifetime of MERCs, the SDAPCD MERC program stipulates that the useful lifetime for HHD diesel-fueled compression-ignition (CI) engine powered vehicles is 10 years. Longer lifetimes may be allowed if they can be demonstrated based on historical records of similar vehicles in similar applications, however, generally, a 10-year lifetime is used for the SDAPCD program for HHD diesel-fueled CI engine powered vehicles. SDAPCD staff indicated that the Otay Mesa Energy Facility accepted a permit condition that they would reduce emissions when the MERCs expire (after 10 years), or attempt to get new credits elsewhere (SDAPCD, Rule 27.1(f)).

## **2.2 Case Study: Texas Commission on Environmental Quality (TCEQ) Treatment of Mobile ERC Lifetime**

On September 20, 2017, TCEQ adopted its revisions to the Texas Emissions Banking and Trading Programs for the generation and use of emission credits from area and mobile sources. On December 7, 2017, the EPA published final approval of those rules.<sup>30</sup>

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<sup>29</sup> Conversation with San Diego APCD staff (Douglas Erwin, Steve Moore), December, 2016.

<sup>30</sup> <https://www.federalregister.gov/documents/2017/12/07/2017-26342/approval-and-promulgation-of-implementation-plans-texas-revisions-to-emissions-banking-and-trading>

There are several areas in which the TCEQ approach differs from the approach used by the SDAPCD. The most significant difference is in its treatment of *surplus*. Instead of allowing credit only for reductions beyond currently promulgated mobile source standards, the TCEQ rule determines the remaining useful life of the replaced engine. It then assumes that the engine would have continued to emit at its tier level for the remainder of its useful life. Creditable emissions are determined by subtracting the emissions from the replacement engine (tons per year), dividing by the remaining useful life (yielding tons) and then amortizing the emissions over 25 years (yielding the tons per year that may be granted to a stationary source).

## **2.3 Case Study: Maricopa County Air Quality Department**

### **2.3.1 Rule 204**

On December 11, 2019, Maricopa County Air Quality Department (MCAQD) adopted revisions to Rule 204, Emissions Reduction Credit (ERC) Generation, Certification and Use. The rule revisions set forth procedures for ERC creation from specific source categories, including for truck stop electrification, reductions in emissions from transport refrigeration units, and onsite equipment, defined as mobile, nonroad industrial, and ground support equipment that are part of the same fleet and used at the same location such as equipment located at, but not limited to, an airport, a distribution center, or a rail yard.

The rules include procedures for quantification (and determination of surplus amounts) of emissions reductions, requirements for generators and users of credits, and procedures when a shortfall of credits is identified.

MCAQD has submitted the rule to EPA for inclusion into the SIP; EPA has taken no action to date.

### **2.3.2 Rule 205**

Similarly, MCAQD has initiated rulemaking to adopt rule 205, which is similar in concept to rule 204, but applies to certain captive on-road fleets<sup>31</sup>. MCAQD held a public meeting in January, 2022 to discuss and receive comments on the rule draft.

### **2.3.3 Intel Source specific offsets**

Lastly, MCAQD has issued a permit to Intel which relies on offsets created from mobile sources, specifically a waste hauler. While the procedures that MCAQD used are consistent with Rule 204 and proposed Rule 205, because neither rule is part of the SIP, MCAQD will need to craft a source specific SIP revision to make those reductions federally enforceable.

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<sup>31</sup> See, <https://www.maricopa.gov/DocumentCenter/View/73202/AQ-2021-004-R205-BOHReport-2022-01-24-PDF>

## References

SDAPCD, 1994. San Diego Air Pollution Control District, Rule 27 “Banking of Mobile Source Emission Reduction Credits”. November. Found at: [http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules\\_and\\_Regulations/Permits/APCD\\_R27.pdf](http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Permits/APCD_R27.pdf).

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Associated Technical Support Document, found at: <https://www.regulations.gov/document/EPA-R09-OAR-2009-0314-0003>.

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## Regulatory References

**MA Rules:** <https://www.mass.gov/doc/310-cmr-7-air-pollution-control/download>

### **310 CMR 7.19(2)(e) – General Provisions**

General guidelines about source specific alternative RACT, lists NO<sub>x</sub> controls to evaluate, etc. Any person subject to a more stringent emission standard either contained in a plan approval (issued pursuant to the Department's regulations) or in a PSD permit or contained in a Department regulation shall remain subject to that more stringent emission standard.

**310 CMR 7.19(4)(a)3.a.i** - energy input capacity of 100 million Btu per hour or greater. For boilers with an energy input capacity greater than or equal to 250 million Btu per hour burning either oil or oil and gas (This includes burning the oil and gas simultaneously or at different times for tangential oil-fired boilers, 0.25 pounds per million Btu).

**310 CMR 7.19(4)(a)3.a.ii** - energy input capacity of 100 million Btu per hour or greater. For boilers with an energy input capacity greater than or equal to 250 million Btu per hour burning either oil or oil and gas (This includes burning the oil and gas simultaneously or at different times for tangential gas fired boilers, 0.20 pounds per million Btu).

### **310 CMR 7.19(4)(a)3.b. – Large Boilers**

(a) Applicability and NO RACT. After May 31, 1995, any person owning, leasing, operating, or controlling a boiler having an energy input capacity of 100 million Btu per hour or greater, at a facility subject to 310 CMR 7.19, shall comply with the following NO emission standards in 310 CMR 7.19(4)(a), except as provided in 310 CMR 7.19(2)(b), 7.19(2)(e), 7.19(2)(f), 7.19(4)(b), 7.19(4)(c) and 7.19(4)(d). 1. For dry bottom boilers burning coal: a. for tangential fired boilers, 0.38 pounds per million Btu; and b. for face fired boilers, 0.45 pounds per million Btu. 2. For stoker-fired boilers burning other solid fuels, 0.33 pounds per million Btu. 3. For boilers with an energy input capacity greater than or equal to 250 million Btu per hour burning either oil or oil and gas (This includes burning the oil and gas simultaneously or at different times. Boilers approved to burn another fuel, such as coal, are subject to this limit only while burning only oil and/or gas and not the other fuel.): a. i. for tangential oil-fired boilers, 0.25 pounds per million Btu; ii. for tangential gas fired boilers, 0.20 pounds per million Btu; and b. for face fired boilers, 0.28 pounds per million Btu.

### **310 CMR 7.19(4)(a)4.a. – Large Boilers**

(a) Applicability and NO RACT. After May 31, 1995, any person owning, leasing, operating, or controlling a boiler having an energy input capacity of 100 million Btu per hour or greater, at a facility subject to 310 CMR 7.19, shall comply with the following NO emission standards in 310 CMR 7.19(4)(a), except as provided in 310 CMR 7.19(2)(b), 7.19(2)(e), 7.19(2)(f), 7.19(4)(b), 7.19(4)(c) and 7.19(4)(d). 1. For dry bottom boilers burning coal: a. for tangential fired boilers, 0.38 pounds per million Btu; and b. for face fired boilers, 0.45 pounds per million Btu. 2. For stoker-fired boilers burning other solid fuels, 0.33 pounds per million Btu. 3. For boilers with an energy input capacity greater than or equal to 250 million Btu per hour burning either oil or oil and gas (This includes burning the oil and gas simultaneously or at different times. Boilers approved to burn another fuel, such as coal, are subject to this limit only while burning only oil and/or gas and not the other fuel.): a. i. for tangential oil-fired boilers, 0.25 pounds per million Btu; ii. for tangential gas fired boilers, 0.20 pounds per million Btu; and b. for face fired boilers, 0.28 pounds per million Btu. 4. For boilers with an energy input capacity greater than or equal to 100 million Btu per hour and less than 250 million Btu per hour burning either oil or oil and gas: a. for boilers with a heat release rate less than or equal to 70 thousand Btu/hours-ft<sup>3</sup>, 0.30 pounds per million Btu.

## **310 CMR 7.19(7)(a)1. [a. & b.] – Stationary Combustion Turbines**

(a) Applicability and NO RACT. After May 31, 1995, any person owning, leasing, operating, or controlling any stationary combustion turbine having an energy input capacity of 25 million Btu per hour or greater at a facility subject to 310 CMR 7.19, shall comply with the following x NO and CO emission standards in 310 CMR 7.19(7)(a), except as provided for in 310 CMR 7.19(2)(b), 7.19(2)(e), and 7.19(2)(f). 1. For combined cycle stationary combustion turbines, based on a one-hour average: a. 42 parts per million volume, dry (ppmvd) NO<sub>x</sub>, corrected to 15% O<sub>2</sub>,<sup>32</sup> when firing gas, and b. 65 ppmvd NO<sub>x</sub>, corrected to 15% O<sub>2</sub>, when firing oil.

### **SCAQMD Rules**

#### **Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines**

Applicable to all stationary gas turbines, 0.3 megawatt (MW) and larger. Emission limits corrected to 15% oxygen on dry basis.

Natural gas – combined cycle/cogeneration turbine = 2 NO<sub>x</sub> (ppmvd)

Natural gas – simple cycle turbine = 2.5 NO<sub>x</sub> (ppmvd)

Produced gas = 9 NO<sub>x</sub> (ppmvd)

#### **Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities**

Emissions Limits (1) Emission Limits for Boilers and Gas Turbines On and after January 1, 2024, the owner or operator of an electricity generating facility shall not operate a boiler or gas turbine in a manner that exceeds the NO<sub>x</sub> emission limits listed in Table 1: Emission Limits for Boilers and Gas Turbines, where: (A) Boilers and gas turbines for which the owner or operator has applied for Permits to Construct after November 2, 2018 shall average the NO<sub>x</sub> emission limits in Table 1 over a 60-minute rolling average. (B) Boilers and gas turbines installed or for which the owner or operator has applied for Permits to Construct prior to November 2, 2018, shall: (i) Average the NO<sub>x</sub> emission limits in Table 1 over a 60-minute rolling average; or (ii) Retain the averaging time requirements specified in the Permit to Operate as of November 2, 2018.

Table 1. Emission Limits for Boilers and Gas Turbines

Boiler: 5 ppmv NO<sub>x</sub>, 3 %, dry oxygen correction

Combine Cycle Gas Turbine & Associated Duct Burner: 2 ppmv NO<sub>x</sub>, 15% dry oxygen correction

Simple Cycle Gas Turbine: 2.5 ppmv NO<sub>x</sub>, 15% dry oxygen correction

#### **Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional & Commercial Boilers, Steam Generators & Process Heaters**

This rule applies to boilers, steam generators, and process heaters of **equal to or greater than 5 million Btu per hour** rated heat input capacity used in all industrial, institutional, and commercial operations.

\*Also gives limits for Group I – Group III Units, thermal fluid heaters.

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<sup>32</sup> For example, “42 ppmvd” refers to  $(42/1,000,000) \times 100 = 0.0042\%$  of the volume of flue gas. “Dry” means that when the emission is measured, the instrument typically removes all moisture (water) from the sample. 15% oxygen means that the regulatory agency has promulgated regulations for specific gas concentrations in the exhaust gas stream as if they were diluted by enough air so that the oxygen level in the gas stream is 15%.

# Appendix A - Detailed Methodology for Potential Offsets from Additional Emissions Controls for a Source Category in Massachusetts

## Methodology

The EPA's 2017 National Emissions Inventory (NEI) Report Dashboard was used to determine large stationary sources of NO<sub>x</sub> across Massachusetts (MA) and highlight the top NO<sub>x</sub> emitters based on facility type. For each of the highest emitting facility categories, the number of individual sites and total emissions for the category were recorded, based on information provided from the 2017 NEI Report Dashboard. For comparison purposes, ERG generated a list of the applicable MA and South Coast Air Quality Management District (SCAQMD) rule(s) for each source category and likely emission unit(s). From there, ERG noted that combustion turbines (both combined and simple cycle) within the Electricity Generation via Combustion category appeared to have high potential for offsets, due to the significant difference between the MA and SCAQMD emission limits. Then, a list of the top Electricity Generation via Combustion sites was generated from the 2017 NEI Report Dashboard. The individual MA permit limits for the largest Electricity Generation via Combustion sites were then compared to the SCAQMD rule to determine which sites were likely to have the highest offset potential.

To approximate the emissions potentially available for offsets from the top three sites, ERG multiplied the reported 2017 emissions for each site by the ratio of the SCAQMD emission limit to the MA emission limit for combined cycle turbines (2 ppmv/42 ppmv). Several assumptions were made in the calculations: 1) ERG utilized the MA and SCAQMD emission limits for combined cycle turbines, since it was assumed that the major turbine emission units were combined cycle – not simple cycle; 2) Emissions from boilers and other emission units were not differentiated because they were assumed to be minor in comparison to combined cycle turbine emissions. To determine the total offsets available using this approach, we multiplied the emissions from the entire source category (2,077.68 TPY) by the ratio of the SCAQMD:MA emission limits, i.e., .2/42. This resulted in remaining emissions for this source category of 98.94 TPY. The remaining emissions (i.e., 98.94 TPY) subtracted from the original emissions (i.e., 2,077.68 TPY) result in potential offsets of 1,978.74 TPY.

**Table A-1. Methodology for Calculating Potential Offsets from Existing Gas Turbines in Massachusetts**

Ranking	Source Category	# Individual Sites	Total NO <sub>x</sub> Emissions (TPY)	Emission Unit	MA Rule	SCAQMD Rule
1	Municipal Waste Combustors	7	4,773	refuse derived fuel incinerator, mass burn incinerator, water wall boiler	N/A	N/A
2	Electricity Generation via Combustion	41*	2,077.68*	combined cycle combustion turbine/heat recovery steam generator	310 CMR 7.19(7)(a)1. [a. & b.]- 42 ppmvd (gas) @ 15% O <sub>2</sub>  65 ppmvd (oil) @ 15% O <sub>2</sub>	Rule 1135 –  combined cycle gas turbine = 2 ppmvd @ 15% O <sub>2</sub>  boiler = 5 ppmvd @ 15% O <sub>2</sub>  simple cycle gas turbine = 2.5 ppmvd @ 15% O <sub>2</sub>
				boilers	310 CMR 7.19(4)(a)3.a. i 0.25 lbs/MMBtu (oil) 310 CMR 7.19(4)(a)3.a.ii. 0.20 lbs/MMBtu (gas)	
				simple cycle combustion turbine	310 CMR 7.19(2)(e)	
3	Airport	213	2,045	boilers	310 CMR 7.19(4)(a)4.a.- 0.30 lbs/MMBtu	Rule 1146 – 30 ppmvd @ 3% O <sub>2</sub> (gaseous fuels) 0.036 lbs/10 <sup>6</sup> Btu (natural gas) 40 ppmvd @ 3% O <sub>2</sub> (non-gaseous fuels)
**5	Institutional	130	882	combustion turbine, heat recovery steam generator, boilers	Emissions units in this category are covered by rules related to the specific type and size of combustion technology. These rules are found at 310 CMR 7.19	Rule 1146 – 30 ppmvd @ 3% O <sub>2</sub> (gaseous fuels) 0.036 lbs/MMBtu (natural gas) OR Rule 1134
6	Aircraft, Aerospace or Related Parts Plant	2	143	boilers, combustion gas turbine	310 CMR 7.19(4)(a)4.a.- 0.30 lbs/MMBtu  310 CMR 7.19(4)(a)3.b.- 0.28 lbs/MMBtu	Rule 1146 – 30 ppmvd @ 3% O <sub>2</sub> (gaseous fuels) 0.036 lbs/MMBtu (natural gas) 40 ppmvd @ 3% O <sub>2</sub> (non-gaseous fuels)

\* Adjusted to exclude Brayton Point Energy (shutdown) & Mystic Station (upcoming shutdown)

\*\* The 4<sup>th</sup> category is not listed because it was the Unspecified source category.



**Table A-2. Electricity Generation via Combustion Category: Largest Emitters of NO<sub>x</sub>**

43 total sites listed – 2 shutdown sites = 41 operational sites

Total category emissions (TPY) → 2,979.08 – 587.88 -313.52 = **2,077.68 TPY**

Source	Comments	Emissions Characteristics
1. <a href="#">Brayton Point Energy LLC</a> : Emissions = 587.88 TPY	a. Shutdown already slated for offsets	
2. <a href="#">Stony Brook Energy Center</a> : Emissions = 564.17 TPY	a. EU 1 - Combined Cycle - Natural Gas and #2 Fuel Oil-fired General Electric MS7001E Combustion Turbine	i. Design capacity: 952 MMBtu/hr ii. PCD: Steam Injection
	b. EU 2 - Combined Cycle - Natural Gas and #2 Fuel oil-fired General Electric MS7001E Combustion Turbine 1B	i. Design capacity: 952 MMBtu/hr ii. PCD: Natural Gas-Dry Low NO <sub>x</sub> Burner, #2 Fuel Oil-Water Injection
	c. EU 3 - Combined Cycle - Natural Gas and #2 Fuel oil-fired General Electric MS7001E Combustion Turbine 1C	i. Design capacity: 952 MMBtu/hr ii. PCD: Steam Injection
	d. EU 4 - Simple Cycle - #2 Fuel Oil-Fired General Electric MS7001E Combustion Turbine 2A	i. Design capacity: 952 MMBtu/hr ii. PCD: water injection
	e. EU 5 - Simple Cycle - #2 Fuel Oil-Fired General Electric MS7001E Combustion Turbine 2B	i. Design capacity: 952 MMBtu/hr ii. PCD: water injection
	f. EU 6&7 - #2 fuel oil-fired and natural gas auxiliary boilers (both 49.8 MMBtu/hr)	
	<b>g. Emission requirements/limits for EU 1-3</b>	i. Oil: 65 ppmvd @ 15% O <sub>2</sub> ii. Gas: 42 ppmvd @15% O <sub>2</sub> iii. Oil/Gas: 75 ppmvd @ 15% O <sub>2</sub>
	<b>h. Emission requirements/limits for EU 4-5 (only use #2 fuel oil)</b>	i. Oil: 75 ppmvd @ 15% O <sub>2</sub>
3. <a href="#">Mystic Station</a> : Emissions = 313.52 TPY	a. Slated for retirement by 2024	

Source	Comments	Emissions Characteristics
4. <a href="#">NEA Bellingham</a> : Emissions = 258.71 TPY	a. EU 1 - Westinghouse Turbine Model No. 501D5	i. Design capacity: 111 MW ii. PCD: Steam Injection
	b. EU 2 - Westinghouse Turbine Model No. 501D5	i. Design capacity: 111 MW ii. PCD: Steam Injection
	c. No boilers, only other EU is 287 hp fire pump	
	<b>d. Emission requirements/limits</b> for EU 1-2	i. NG - 0.0859 lb/MMBtu per turbine; 220.0 lb/hr (EU 1 & 2 combined)
5. <a href="#">Fore River Energy Center</a> : Emissions = 123.97 TPY	a. EU 1 - Combined Cycle - Mitsubishi Heavy Industries Model No. 501G Combustion Turbine/Deltak Heat Recovery Steam Generator with Duct Burner (#11)	i. Design capacity during NG firing: 2,955 MMBtu/hr; Design capacity during oil firing: 3,001 MMBtu/hr ii. PCD: Dry Low NOx Combustors, Selective Catalytic Reduction, CO Oxidation Catalyst
	b. EU 2 - Combined Cycle - Mitsubishi Heavy Industries Model No. 501G Combustion Turbine/Deltak Heat Recovery Steam Generator with Duct Burner (#12)	i. Design capacity during NG firing: 2,955 MMBtu/hr; Design capacity during oil firing: 3,001 MMBtu/hr ii. PCD: Dry Low NOx Combustors, Selective Catalytic Reduction, CO Oxidation Catalyst
	<b>c. Emission requirements/limits</b> for EU 1-2	i. NG: Operation at >= 55% power or load, excluding start-ups and shutdowns and fuel transfers (1) £ 21.8 lb/hr, 0.0074 lb/MMBtu, 2.0 ppmvd @ 15% O <sub>2</sub>
6. <a href="#">Medical Area Total Energy Plant</a> : Emissions = 122.67 TPY	a. EU CTG-1 - Alstom Gas Combustion Turbine No. 1	i. Design capacity: 152.6 MMBtu/hr
		ii. PCD: SCR/CO Catalysts
		<b>iii. Emission requirements/limits:</b> (NG) 2.0 ppmvd@15% O <sub>2</sub>
	b. EU CTG-2 - Alstom Gas Combustion Turbine No. 2	i. Design capacity: 152.6 MMBtu/hr
		ii. PCD: SCR/CO Catalysts
		<b>iii. Emission requirements/limits:</b> same as EU CTG-1
c. EU CTG-3 - Solar Titan 130 Combustion Turbine	i. Design capacity: 164.6 MMBtu/hr (natural gas); 158.8 MMBtu/hr (ULSD)	
	ii. PCD: Dry Low NOx Combustor, SCR/CO Catalysts	
	<b>iii. Emission requirements/limits:</b> (NG) 2.0 ppmvd @ 15% O <sub>2</sub> with or without DB; 0.0074 lb/MMBtu with or without DB; 1.21 lb/hr without DB; 1.51 lb/hr with DB; 25 ppmvd @15% O <sub>2</sub> or 150 ng/J of useful output (1.2 lb/MWh)	

Source	Comments	Emissions Characteristics
7. <a href="#">Masspower LLC</a> : Emissions = 83.7 TPY	a. EU 1 - Combined Cycle - Natural Gas and #2 Fuel Oil-fired General Electric 7EA Combustion Turbine	i. Design capacity: 1250 MMBtu/hr ii. PCD: Steam Injection & Selective Catalytic Reduction
	b. EU 2 - Combined Cycle - Natural Gas and #2 Fuel Oil-fired General Electric 7EA Combustion Turbine	i. Design capacity: 1250 MMBtu/hr. ii. PCD: Steam Injection & Selective Catalytic Reduction
	c. No other major EUs	
	<b>d. Emission requirements:</b> NG- 37.6 lbs/hr.; 0.036 lb./MMBtu; Oil- 77.0 lbs/hr.; 0.070 lb./MMBtu	
8. <a href="#">ANP Blackstone Energy Company LLC</a> : Emissions = 80.7 TPY	a. EU 1 - ABB GT-24 Combustion Turbine	i. Design capacity: 2183 MMBtu/hr. ii. PCD: Selective Catalytic Reduction and Carbon Monoxide catalysts
	b. EU 2 - ABB GT-24 Combustion Turbine	i. Design capacity: 2183 MMBtu/hr. ii. PCD: Selective Catalytic Reduction and Carbon Monoxide catalysts
	<b>c. Emission requirements/limits for EU1-2:</b> NG - 9 lbs/hr., 0.007lb/MMBtu, 2.0 ppmvd @ 15% O <sub>2</sub> (all @ 50% load)	i. Also provides limits for 75%, 100% and >100% --+ Steam Augmentation
9. <a href="#">ANP Bellingham Energy Company LLC</a> : Emissions = 80.4 TPY	a. EU 1 - ABB GT-24 Combustion Turbine	i. Design capacity: 2183 MMBtu/hr. ii. PCD: Selective Catalytic Reduction and Carbon Monoxide catalysts
	b. EU 2 - ABB GT-24 Combustion Turbine	i. Design capacity: 2183 MMBtu/hr. ii. PCD: Selective Catalytic Reduction and Carbon Monoxide catalysts
	<b>c. Emission requirements/limits for EU1-2:</b> NG - 9 lbs/hr., 0.007lb/MMBtu, 2.0 ppmvd @ 15% O <sub>2</sub> (all @ 50% load)	i. Also provides limits for 75%, 100% and >100% --+ Steam Augmentation

## Appendix B: Review of Offset Banking and Trading Regulations and Policies of 11 Coastal States in the Ozone Transport Region

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
CT	<b>Sec. 22a-174-3a. Permit to construct and operate stationary sources</b>	Yes, but not a separate regulation rather section of NSR permitting regulations at: Sec. 22a-174-3a(4) Offsetting emission reductions or Emission Reduction Credits.	ERCS must be approved by the commissioner in writing after the submission to the commissioner of documents satisfactory to the commissioner or incorporated into a permit as a restriction on emissions.	Yes. NO <sub>x</sub> = 236 TPY; VOC = 16 TPY.	Yes, but not explicit in regulations. Regulations require reductions must come from equal or higher non-attainment classification than the area in which the proposed activity would take place, and if emissions from such other non-attainment area contribute to a violation of a National Ambient Air Quality Standard in the non-attainment area in which the proposed activity would take place. It appears that there have been agreements between: NY and CT 1999 for unlimited use and trade of emission credits in either state.	No.	Maybe, regs. say there must be an air quality benefit from reductions that "shall include, but not be limited to increases and decreases of emissions from stationary sources"	Yes.	Regulations: <a href="https://www.epa.gov/sites/default/files/2017-10/documents/ct-22a-174-3a.pdf">https://www.epa.gov/sites/default/files/2017-10/documents/ct-22a-174-3a.pdf</a>  Emission Reduction Credit Registry:  <a href="https://portal.ct.gov/DEEP/Air/Compliance-Assurance/Emissions-Reduction-Credit-Registry">https://portal.ct.gov/DEEP/Air/Compliance-Assurance/Emissions-Reduction-Credit-Registry</a>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
DC	204 Permit Requirements For Major Sources Located In Non-Attainment Areas (New Source Review)	No.	Case-by-case by permit transactions.	No.	Not clear from permitting regulations.	No.	Not clear from permitting regulations.	Yes.	Regulations: <a href="https://dcregs.dc.gov/Common/DCMR/RuleList.aspx?ChapterNum=20-2">https://dcregs.dc.gov/Common/DCMR/RuleList.aspx?ChapterNum=20-2</a>
DE	1134 Emission Banking and Trading Program	Yes.	Permit for stationary sources. SIP revision for mobile sources.	No.	Yes, but reductions must be from equal or higher nonattainment classification than the one in which they are used. Emission units located in areas designated as attainment or marginal nonattainment areas that are located within the ozone transport region shall be considered located in moderate ozone nonattainment areas for the purpose of this regulation.	No.	Yes.	No.	Regulations: <a href="https://regulations.delaware.gov/AdminCode/title7/1000/1100/1134.pdf">https://regulations.delaware.gov/AdminCode/title7/1000/1100/1134.pdf</a>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
MA	<p><b>310 CMR 7.00: Appendix A: Emission Offsets and Nonattainment Review</b></p> <p><b>310 CMR 7.00: Appendix B: U Emission Banking, Trading, and Averaging</b></p>	Yes. Note, MassDEP requires an offset ratio of at least 1.26 tons of offset emissions for each ton of a project's annual potential emissions (1.26 is derived from the federally required 1.2:1 offset ratio coupled with a 5% public benefit set aside).	ERC Approval document.	Yes. NO <sub>x</sub> = 271 TPY; VOC = 40 TPY; CO = 22 TPY	Yes. But reductions must be from equal or higher nonattainment classification than the area in which the source is located and emissions from such other area contribute to a violation of a national ambient air quality standard in the nonattainment area in which the proposed new or modified source would construct. MA has a MOU with NY for transfer of offsets. According to MOU, NY and MA make any necessary adjustment to the ERCs in accordance with originating state's laws, such as RACT regulations promulgated since date the reductions made, prior to transfer of offset credits.	No.	Yes.	Yes.	<p>Regulations:</p> <p><a href="https://www.epa.gov/system/files/documents/2021-12/cmr-7-app-a.pdf">https://www.epa.gov/system/files/documents/2021-12/cmr-7-app-a.pdf</a></p> <p><a href="https://www.sec.state.ma.us/reg_pub/pdf/300/310007d.pdf">https://www.sec.state.ma.us/reg_pub/pdf/300/310007d.pdf</a></p> <p>MassDEP Emission Reduction Credit (ERC) Registry, September 2021 at:</p> <p><a href="https://www.mass.gov/doc/massdep-emission-reduction-credit-erc-registry-september-2021">https://www.mass.gov/doc/massdep-emission-reduction-credit-erc-registry-september-2021</a></p>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
MD	<b>Chapter 26.11.17. Nonattainment Provisions for Major New Sources and Major Modifications</b>	Yes, but not a separate regulation rather part of NSR permitting regulations at: Sec. 26.11.17.04. Creating Emission Reduction Credits (ERCs)	Permit limit. ERCs must be certified and verified by the Department on a case-by-case basis.	Yes. As of November 2020: NO <sub>x</sub> = 2,591.3 TPY VOC = 92.7 TPY	Yes. But reductions must come from equal or higher nonattainment classification than the area in which the emissions unit is located and emissions of pollutant from the other area have been demonstrated to contribute to a violation of the National Ambient Air Quality Standard in the area in which the new emissions unit is located.	Yes.	Not clear from permitting regulations.	Yes.	Regulations: <a href="http://mdrules.elaws.us/comar/26.11.17">http://mdrules.elaws.us/comar/26.11.17</a>  Available Emission Reduction Credits (ERC) at: <a href="https://mde.maryland.gov/programs/permits/airmanagementpermits/pages/available-ercs.aspx">https://mde.maryland.gov/programs/permits/airmanagementpermits/pages/available-ercs.aspx</a>
ME	<b>Chapter 113: Growth Offset Regulation</b>	Yes.	Department Order.	No.	Yes. But reductions must come from equal or higher nonattainment classification than the area in which the emissions unit is located and emissions of the pollutant from the other area have been demonstrated to contribute to a violation of the National Ambient Air Quality Standard in the area in which the new emissions unit is located.	Yes.	Yes.	Yes.	Regulations: <a href="https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/2003-mech113.pdf">https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/2003-mech113.pdf</a>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
NH	<p><b>Chapter Env-A 3000 - Emissions Reduction Credits Trading Program</b></p> <p><b>Chapter Env-A 3100 Discrete Emissions Reductions Trading Program</b></p>	Yes.	Certificate issued by Department after public notice and hearing process.	<p>Yes.</p> <p>NO<sub>x</sub> = Approximately 725 TPY (combined ozone and non-ozone season) ERCs and approx. 8,000 tons discrete emission reductions (DERs);</p> <p>VOC = Approx 600 TPY ERCs and 100 DERs.</p>	Yes. But only allows credits from another nonattainment area if the other area has an equal or higher nonattainment classification than the area in which the source is located and emissions from such other area contribute to a violation of the NAAQS for ozone in the nonattainment area in which the source is located.	Yes.	Yes.	No.	<p>Regulations:</p> <p><a href="https://casetext.com/regulation/new-hampshire-administrative-code/title-env-a-air-related-programs/chapter-env-a-3000-emissions-reduction-credits-trading-program">https://casetext.com/regulation/new-hampshire-administrative-code/title-env-a-air-related-programs/chapter-env-a-3000-emissions-reduction-credits-trading-program</a></p> <p><a href="https://casetext.com/regulation/new-hampshire-administrative-code/title-env-a-air-related-programs/chapter-env-a-3100-discrete-emissions-reductions-trading-program">https://casetext.com/regulation/new-hampshire-administrative-code/title-env-a-air-related-programs/chapter-env-a-3100-discrete-emissions-reductions-trading-program</a></p> <p>NH Emissions Reductions Trading Registry at:</p> <p><a href="https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/registry.pdf">https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/registry.pdf</a></p>



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NJ	<b>Title 7 Chapter 27 Subchapter 18 Control And Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rule)</b>	Yes, but not a separate regulation rather part of NSR permitting regulations at: 7:27-18.5 Standards for use of emission reductions as emission offsets	Permit.	Yes. NO <sub>x</sub> = 971 TPY and VOCs = 62 TPY from shutdowns in last 5 years; NO <sub>x</sub> = 635 TPY and VOC = 21 TPY from shutdowns 5 to 10 years NO <sub>x</sub> = 335 TPY and VOC = 770 TPY from non-shutdowns. Totals are for all counties and NA designations.	Yes, New Jersey's Air Pollution Control Act, N.J.S.A. 26:2C- 1 et seq., and Emission Offset rule, N.J.A.C. 7:27-18.5(j), allows for the transfer/trading of emission reduction credits (ERCs) between sources in the same federally designated nonattainment area and does not prohibit interstate transfer/trading of ERCs. But NJ requires application of a distance factor and combined effects of proposed emission reductions and of meeting the LAER requirements will result in a net air quality benefit.	NJ's emission offset rule does not allow inter-pollutant trading for NO <sub>x</sub> and VOC offsets. It only allows NO <sub>x</sub> and SO <sub>2</sub> inter-pollutant trading for PM <sub>2.5</sub> , under specific circumstances. See 7:27-18.5(g) and (l).	Yes.	Yes, but older version (1993) in SIP does not contain all latest relevant regulatory language.	Regulations: <a href="https://www.nj.gov/dep/aqm/currentrules/Sub18.pdf">https://www.nj.gov/dep/aqm/currentrules/Sub18.pdf</a>  New Jersey's Banked Emission Credits at: <a href="https://www.state.nj.us/dep/agpp/bec.html">https://www.state.nj.us/dep/agpp/bec.html</a>  Using Creditable Emission Reductions (CERs) as Emission Offsets at: <a href="https://www.state.nj.us/dep/agpp/downloads/bec/UsingCERs.pdf">https://www.state.nj.us/dep/agpp/downloads/bec/UsingCERs.pdf</a>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
NY	Subpart 231-10 Emission Reduction Credits (ERCs)	Yes.	Permit. Mobile source and demand-side management credits require SIP revision.	Yes. Shown as available for offsets as of April 20, 2022: NO <sub>x</sub> = approx. 24,000 TPY; VOC = approx. 2,400 TPY. Totals are for all counties and NA designations.	Yes, for States within OTR but requires reciprocity agreement. New York has four reciprocity agreements in place with Pennsylvania, Connecticut, Massachusetts, and New Hampshire.	No, for O <sub>3</sub> precursors. But inter-pollutant trading would be allowed for PM <sub>2.5</sub> however, without any current nonattainment areas for PM <sub>2.5</sub> the pollutants and their respective ratios are unknown. Requires "same class of nonattainment contaminant."	Yes.	Yes, but older version (2009) in SIP does not contain all latest relevant regulatory language.	<p>Regulations: <a href="https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=le9b80dc0334f11deb24981dc49d16207&amp;originContext=documenttoc&amp;transitionType=Default&amp;contextData=(sc.Default)">https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=le9b80dc0334f11deb24981dc49d16207&amp;originContext=documenttoc&amp;transitionType=Default&amp;contextData=(sc.Default)</a></p> <p>New York State Department of Environmental Conservation Emission Reduction Credits (ERCs) Registry at: <a href="https://www.dec.ny.gov/docs/air_pdf/ercregistry.pdf">https://www.dec.ny.gov/docs/air_pdf/ercregistry.pdf</a></p> <p>Also see 6 NYCRR Part 231 Implementation Guidance at: <a href="https://www.dec.ny.gov/chemical/63377.html#ERCs">https://www.dec.ny.gov/chemical/63377.html#ERCs</a></p>

State	Regulation	Offset Trading Regulations?	Mechanisms for making enforceable	Registry? If so, quantity.	Interstate Trading?	Inter-pollutant Trading?	Non-stationary reductions creditable?	SIP-approved?	Reference Documents
PA	<b>Chapter 127. Construction, Modification, Reactivation and Operation of Sources Subchapter E. New Source Review</b>	Yes but not a separate regulation rather part of NSR permitting regulations at: § 127.207. Creditable emissions decrease or ERC generation and creation.	Department reviews and approve the ERC registry application and registration of the ERCs in the registry system is certification. Permit for use. Credits from mobile sources or other economic incentive program must be approved by EPA as a SIP revision.	Yes. NO <sub>x</sub> = approx. 58,000 TPY; VOC = approx. 800 TPY Totals are for all counties and NA designations.	Yes, but State must have reciprocity with PA for trading and use of ERCs and only upon the approval of both PA and the other state through SIP approved rules and procedures, including an EPA approved SIP revision. ERCs generated in another state may not be traded into or used at a facility within PA unless the ERC generating facility's ERCs are enforceable by the Department. It appears that there have been agreements between New York and Pennsylvania 1996 Unlimited use and trade of emission credits in either states.	Not clear from regulation.	Yes. Mobile source or another Economic Incentive Program.	Yes but older versions of sections (2007, 2011) in SIP do not contain all latest relevant regulatory language.	Regulations: <a href="http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter127/subchapEtoc.html&amp;d=reduce">http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter127/subchapEtoc.html&amp;d=reduce</a>  See PA's Emission Reduction Credit Files, including credit registry and reciprocity agreements with MD and NY at: <a href="https://www.dep.pa.gov/Business/Air/BAQ/Permits/Pages/EmissionCredit.aspx">https://www.dep.pa.gov/Business/Air/BAQ/Permits/Pages/EmissionCredit.aspx</a>
RI	<b>Air Pollution Control Regulation No. 9</b>	Yes, but not a separate regulation, rather part of NSR permitting regulations at: 9.4.3 Emission Offset Demonstration	Permit.	No.	Not explicitly allowed by regulations.	No.	Yes. See Regulation 9, Section 9.4.3(a).	Yes.	Regulations: <a href="http://www.dem.ri.gov/programs/director/legal/tollregs/air09_09.pdf">http://www.dem.ri.gov/programs/director/legal/tollregs/air09_09.pdf</a>