

Feather River Air Quality Management District AB 617 Community Air Protection Program Incentives

Stationary Diesel Engines Emission Reductions Project Plan

1. Project Identification

This document serves as the “Project Plan” for Stationary Diesel Engines Emission Reductions. It was drafted according to the guidelines laid out in the Community Air Protection Incentives 2019 Guidelines¹. It describes the nature of the strategy, its support by the community, requirements for entities desiring to participate and receive project funding, how these projects will benefit the community through improved air quality, as well as other key aspects like project selection criteria and inspection requirements.

This Project Plan is applicable to stationary source projects and will fund the replacement of older diesel internal combustion engines with cleaner technology that is beyond what is currently required, with an emphasis on zero-emission technology. The eligible source classification code for eligible engines is 20200401.

This Project Plan will replace older emergency, backup engines with zero-emission technology or newer cleaner engines. The California Air Resources Board’s Technology Clearing House Tool includes information on available technology options for backup power. The tool is available at: <https://ww2.arb.ca.gov/our-work/programs/public-safety-power-shutoff-psps-events/emergency-backup-power-options-commercial>. The Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines² (Title 17, CCR section 93115 through 93115.15) was adopted to reduce diesel particulate matter (PM) and criteria pollutant emissions from stationary diesel-fueled compression ignition engines. The ATCM applies to emergency and prime engines with a rated brake horsepower greater than 50. Existing emergency diesel engines with a PM standard of 0.40 grams per brake horsepower-hour or greater (uncertified, Tier 0 and Tier 1) may operate a maximum of 20 hours per year under the ATCM for non-emergency use (maintenance and testing). These engines would be replaced by Tier 4 diesel or zero-emission technology.

¹ CARB. 2020. Community Air Protection Incentives 2019 Guidelines. October 14. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-10/cap_incentives_2019_guidelines_final_rev_10_14_2020_0.pdf. Accessed: April 2021.

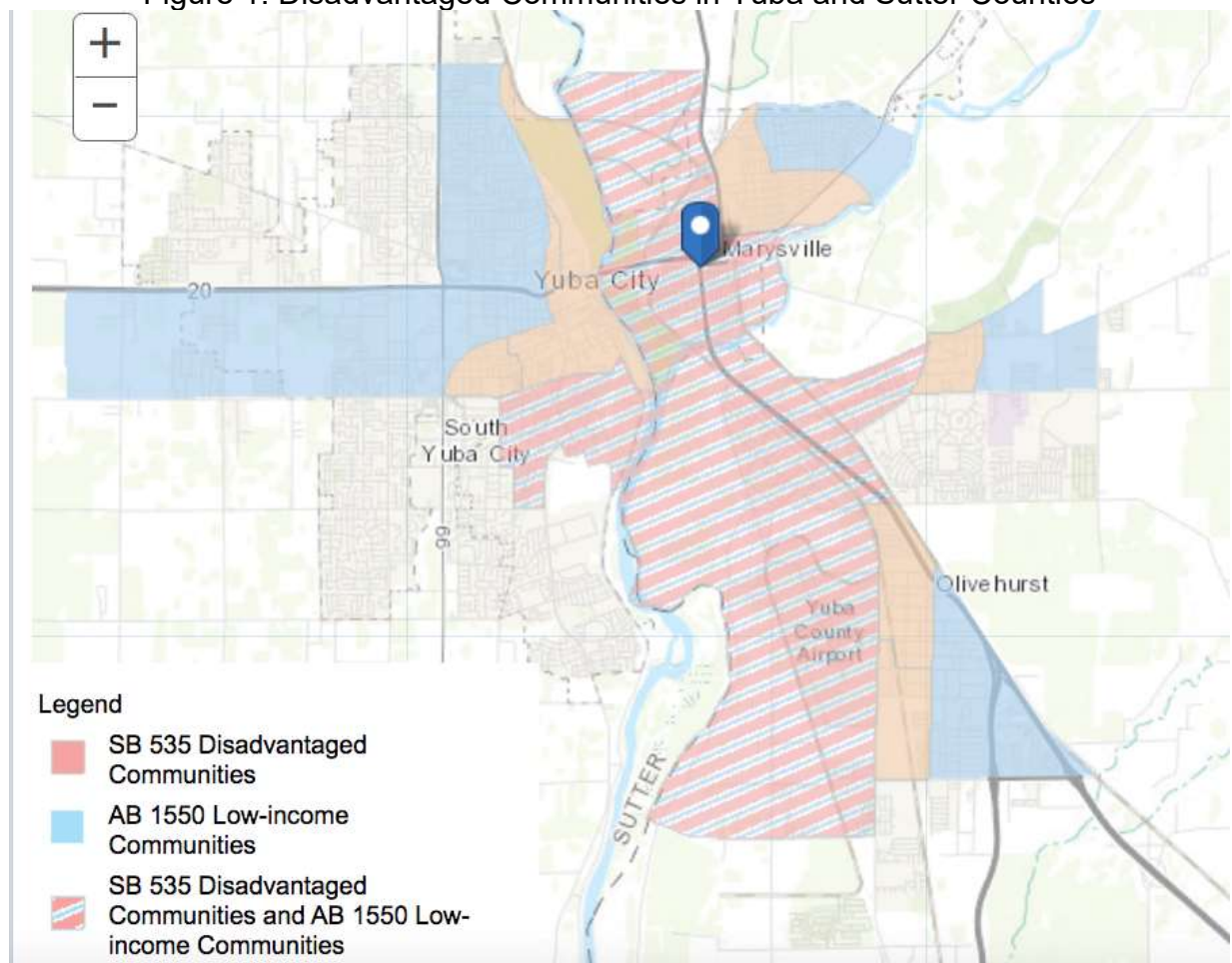
² <https://ww2.arb.ca.gov/sites/default/files/classic//diesel/documents/finalreg2011.pdf>

2. Community Support

The Project Plan will be implemented in the Feather River AQMD with the jurisdictional boundaries of Yuba and Sutter counties. The Community Air Protection Incentive Funds will be primarily spent on projects within and benefitting disadvantaged and low-income communities. There are several disadvantaged census tracts in Yuba County and one in Sutter County in CalEnviroScreen³. They are generally located in the cities of Marysville and Yuba City and in the Olivehurst/Linda community, as seen in figure 1. The District does not contain an AB 617 Community and does not have a Community Emissions Reduction Program or a steering committee. Outreach on the AB 617 program has been conducted through the following:

- Social media
- Newspaper print notices
- Press releases and press events
- Community events
- Webinars/meetings
- Surveys

Figure 1: Disadvantaged Communities in Yuba and Sutter Counties



³ <https://oehha.ca.gov/calenviroscreen>

The City of Marysville has expressed strong support for projects that reduce emissions from stationary diesel engines and has submitted applications to the District to fund the replacement of emergency diesel engines. The District has updated its Board of Directors, represent the cities and counties in the Disadvantaged Communities, on the AB 617 Program and presented the draft Stationary Engine project plan to the Board at the June 7, 2021, meeting. At the meeting, District staff presented the project plan and provided an opportunity to the elected representatives of the Disadvantaged Communities and the public to comment on the proposed plan. The District did not receive any public comments on the project plan at the meeting.

The proposed project plan was made available for public review and comment for 30 days during the month of June on the District's website. During the 30-day public comment period, the project plan was promoted on social media. The District did not receive any comments from the public on the project plan through social media.

The District has posted a survey on its website to solicit feedback from the public on the sources of air pollution they are most concerned about in their communities and the types of projects the District should implement to reduce air pollution in their communities. As on July 13, 2021, the District has received 72 responses to the survey. The community of Marysville has submitted the most responses, totaling 57 of the 72. We have also received comments from Yuba City, Brownsville/Challenge, Wheatland, Sutter, and Linda/Olivehurst. The public has reported that cleaner school buses (66), electric vehicle charging stations (3), on-road trucks (1), and incentives to purchase electric vehicles (2) are projects they would like the District to implement in their communities. The public has also reported that rice dryers are a source of air pollution they are most concerned about in their community.

3. Eligibility and Requirements

(A) Stationary Diesel Engine Project Eligibility

Public agencies that own and operate stationary diesel engines are eligible to apply. The engines must have a current Permit to Operate from the District and be in compliance with the Stationary Diesel Engine Air Toxic Control Measure⁴.

A public agency is defined as the state or any local subdivision thereof, or any state or local department, agency, board or commission.

(B) Existing Engine Requirements

To be eligible for replacement, existing engines must:

- 1) Meet and maintain compliance with all Federal, State, and Local requirements applicable to emergency diesel engine use in the District.
- 2) Have a valid District Permit to Operate.
- 3) Be at least 25 horsepower.

⁴ ATCM for Stationary Compression Ignition Engines, CCR 17 §93115

- 4) Be fueled by diesel.
- 5) Be uncertified or Tier 1 with a PM emissions rating of equal to or greater than 0.40 g/bhp-hr.
- 6) Be operational.

(C) Replacement Engine Requirements

- 1) The replacement engine must be available for inspection if requested by District staff or CARB staff during the contract period and in accordance with the terms of the Permit to Operate.
- 2) Replacement engines must provide EPA certification or CARB executive order or be source tested to verify emission reductions. Replacement engines must meet Final Tier 4 or higher emission standards. Zero-emission technology will be considered on an individual basis and once approved by the District, will not require certification or source testing.
- 3) Replacement engines should be no greater than 125% above the existing engine brake horsepower rating, unless a larger engine would result in greater emission reductions.
- 4) The applicant may not claim emission reduction credits from the project during the entire contract period.
- 5) The replacement engine must be under contract for the entire project life, which may range from three to ten (3-10) years.
- 6) During the entire project life, the applicant must submit an annual report of hours operated.

(D) Process and Participant Requirements

- 1) Participants will be required to submit a complete project application, which includes a quote for the new engine, Permit number, and an executive order for new engine (if diesel).
- 2) Applications selected for funding will be processed by District staff and Participant will provide all necessary engine data to be entered into the spreadsheet to calculate emission reductions.
- 3) Pre-inspection of the engine will be conducted by District staff. During the pre-inspection District staff will verify engine information and hour meter reading. A compliance inspection conducted within the past 12 months may be substituted for the pre-inspection if it confirms the engine information and hour meter reading. The pre-inspection or compliance inspection must verify the function and use of the engine as backup emergency power generation to an existing building, structure, utility, or other use.
- 4) Once the application and pre-inspection have been approved, a contract will be offered to the participant. Once both parties have agreed to sign the contract, the participant will be notified of the contract execution. If the new engine requires a District Permit, the participant will then submit an Authority to Construct to the District. Once the Authority to Construct

has been issued, the participant may proceed with the purchase and installation of the new engine. If the zero-emission technology does not require an Authority to Construct, the participant may proceed with the purchase and installation upon notification of contract execution.

- 5) Once a Participant has purchased and installed their new engine or zero-emission technology, they must contact the District to complete the post-inspection. During the post inspection, the District will verify the engine or technology meets the Final Tier 4 or higher emission standard by photographing and recording the EPA family on the equipment and any control equipment.
- 6) If the equipment is required by the District to conduct a source test to verify emissions, the results of the source test must be received within 30 days of the post-inspection.
- 7) After the successful post-inspection, the Permit to Operate for the new engine will be issued, if applicable.
- 8) The invoice from the purchase and installation of the new engine or zero-emission and a W-9 tax form should be submitted to the District.
- 9) The old engine must be surrendered to an approved salvage yard within 30 days of the post-inspection. The old engine must be destroyed and rendered permanently inoperable. At a minimum, the destruction of an engine must include:
 - (1) A hole in the engine block with a diameter of at least three inches at the narrowest point. The hole must be irregularly shaped (i.e. no symmetrical squares or circles) and
 - (2) A section of the oil pan flange must be removed as part of the hole or have a line cut through it that connects the hole.

Once all of these requirements have been met, the District will submit a check request. The check will be mailed to the participant.

(E) Rules and Regulations Applicable to Stationary, Emergency Diesel Engines

Existing diesel engines must be in compliance with all local, state, and federal rules and regulations to be eligible for funding. This section lists the rules apply to stationary, emergency diesel-fueled engines.

New diesel engines and alternative fuel engines will be reviewed for compliance during the ATC review. In some instances, existing engines and new engines have different emission standards or usage limitations.

Zero-emission technology is not subject to any of the following rules and regulations.

Table 1 FRAQMD Rules Applicable to Engines

FRAQMD Rule #	Summary of Requirement	Applicable to Existing Engine	Applicable to New Engine
Rule 3.0 Visible Emissions	<i>Facility shall not emit visible emissions for a period or periods aggregating more than 3 minutes in any one hour as dark or darker in shade as that designated as No. 2 on the Ringlemann Chart, as published by the United States Bureau of Mines; or of such opacity as to obscure an observers view to a degree equal to or greater than does smoke described above.</i>	Yes	Yes
Rule 3.2 Particulate Matter Concentration	<i>Facility shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of gas at standard conditions. When the source involves a combustion process, the concentration must be calculated to 12 per cent carbon dioxide (CO₂).</i>	Yes	Yes
Rule 3.3 Dust and Fumes	<i>Facility shall not discharge in any one hour from any source whatsoever dust or fumes in total quantities in excess of the amounts as prescribe for and shown in District's Rule 3.3 Table of Allowable Rate of Emission Based on Process Weight Rate.</i>	Yes	Yes
Rule 3.10 Sulfur Oxides	<i>A facility shall not discharge into the atmosphere from any single source of emission whatsoever, any sulfur oxides in excess of 0.2 percent by volume (2,000 ppm) collectively calculated as sulfur dioxide (SO₂).</i>	Yes	Yes
Rule 3.13 Circumvention	<i>A facility shall not be build, erect, install, or use any article, machine, equipment or other contrivance, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, reduces or conceals an emission which would otherwise constitute a violation of the Health and Safety Code of the State of California or of these Rules and Regulations.</i>	Yes	Yes
Rule 3.22 IC Engines	<i>All new and existing internal combustion engines rated above 50 horsepower shall not operate above the listed emission limitations according to the area of designation and fuel type. Engines designated as emergency, portable, or low use (<200 hours/year) shall not be subject to the emission standards.</i>	Not subject to emission standards as an emergency engine	Not subject to emission standards as an emergency engine

Table 2 California Rules Applicable to Engines

California Rule or Regulation	Existing Engine Applicability	New Diesel Engine Applicability
ATCM for Stationary Compression Ignition Engines [CCR 17 §93115]	In-Use Emergency >0.4 g/bph-hr allowed 20 hrs/year maintenance and testing	New emergency with PM 0.01 to 0.15 allowed 50 hours M/T
<i>HSC 41700 Facility shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a natural tendency to cause injury or damage to business or property.</i>	Yes	Yes
<i>HSC 42301.6 ". . . prior to approving an application for a permit to construct or modify a source which emits hazardous air emissions, which source is located within 1,000 feet from the outer boundary of a school site, the air pollution control officer shall prepare a public notice in which the proposed project or modification for which the application for a permit is made is fully described." Additionally, each address within 1000 feet radius of the source shall also be notified."</i>	Yes	Yes

Table 3 Federal Rules Applicable to Engines

Federal Rule or Regulation	Existing Engine Applicability	New Diesel Engine Applicability
40 CFR 63 Subpart ZZZZ - Reciprocating Internal Combustion Engines (03/2008)	Existing engine at area source not applicable	New engine at area source, complies by meeting 40 CFR 60 Subpart IIII
40 CFR 60 Subpart IIII: NSPS for Stationary CI Engines (07/2006)	Does not apply to engines installed prior to July 11, 2005	New emergency engine must meet emission standard, sulfur content, and opacity standards.

4. Funding Amounts

The District will fund the zero-emission technology at 95% of the eligible costs of the project. The District will fund distributed generation (DG) (compliant with CARB’s DG standard) technology at 90% of the eligible costs of the project. The District will fund

the Tier 4 diesel engines at 85% of the eligible costs of the project.

Eligible costs will be determined by the District before a contract is offered.

Eligible costs include:

- Purchase of technology that is beyond what is currently required, including zero-emission technology, DC compliant, or Tier 4 diesel engines
- Equipment and materials necessary to install new engine/technology
- Fuel storage equipment for zero emissions and DC compliant equipment
- Hour meters
- Installation, if hourly rate is included on invoices
- Delivery charges

Expenses not to be included in grant amount but may count towards eligible costs and participant's cost share of 5-15% include:

- Sales tax
- Permit fees, including District's ATC/PTO and required building permits

Costs not eligible to be funded and not eligible to count towards participant's cost share:

- Purchase, lease, or rental of land
- Planning and design fees
- Consultant fees
- Administrative/staff time of public agency to participate
- CEQA or environmental analysis costs

5. Project Selection and Ranking

Projects will be selected according to the process established in the District's Community Air Protection Incentive Funds Policy and Procedures Guidelines⁵:

The District will prioritize eligible projects based on emission benefit, proximity to sensitive receptors, and cost using the following criteria (from highest priority to lowest priority):

- a) Projects in disadvantaged communities addressing a primary community need as determined based on community engagement.
- b) Projects in low-income communities addressing a primary community need as determined based on community engagement.
- c) Projects located outside of disadvantaged or low-income communities that may benefit these communities.
- d) Eligible projects located outside of disadvantaged and low-income communities.

⁵ Community Air Protection Incentives, Policy and Procedures Manual, Feather River AQMD, March 17, 2020

6. Tracking Projects

The District maintains a website for the Community Air Protection Program and this is where projects can be tracked. The website address is:

<https://www.fraqmd.org/community-air-protection-program>.

The initial list of projects will be posted to the District's website prior to final approval. Once projects are selected and contracts are executed, the awarded project list with the contracted amount and final project description will be posted to the website. Projects will also be reported to the California Air Resources Board per grant agreement terms for submittal to the California Climate Investments Reporting and Tracking System, or CCIRTS database, where the emissions reductions, and benefits to priority populations will be tracked, compiled, and made available for public review.

7. Cost Benefit Analysis

(A) Overview of Benefits and Emission Reductions

The project plan will result in a reduction of toxic air contaminants, criteria air pollutants, and greenhouse gas emissions. The communities surrounding the projects in the disadvantaged communities will see the greatest benefits as toxic air contaminants affect those living closest to the source of emissions. The emission reduction calculation methodology will only calculate emissions from maintenance and testing hours because emergency hours are not limited on the permit nor are they routine or predictable.

During an emergency event, such as a loss of power, the project will result in an even greater benefit to the community surrounding the project. The cleaner engine or zero emission technology will emit less toxic air contaminants, criteria air pollutants, and greenhouse gases during the emergency event than the existing engines.

A review of District permits performed in November 2021 showed five permits issued to local cities or counties that included at least one uncertified or Tier 1 diesel emergency generator located in the current boundaries of the disadvantaged community. In addition there are eight permits issued to municipality owned utilities for backup generators in the DAC which may also include eligible engines, and 11 permits issued to investor owned utilities and private entities.

The District will calculate emission reductions for each project funded under this project plan. Emission reductions for criteria and toxic air contaminants will be calculated using the District's standard method for stationary emergency engines when issuing an Authority to Construct/Permit to Operate in accordance with Health and Safety Code section 42300, District Regulation III Stationary Sources, Regulation IV Stationary Emission Sources Permit System and Registration, and Regulation X New Source Review.

(B) Calculating Criteria Air Pollutants

1) Source of Emission Factors

The District uses the most representative emission factor available for the engine. This may include source test data, manufacturer's specifications, CARB Executive Order for the engine family, Certification Level Steady-State Modal Test Results from US EPA, or AP-42. Executive Orders are written documentation of compliance with CARB regulations, for example vehicles or products certified to specific emissions standards.

Executive Orders for new off-road diesel engines can be found at <https://www.arb.ca.gov/msprog/offroad/cert/cert.php>. Certification Level Test Results can be found at US EPA's website: <https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment> under Nonroad Compression Ignition Engines. [AP-42 Compilation of Air Pollutant Emission Factors](#) is a compilation of EPA's emission factor information and has been published since 1972. The District also uses the Santa Barbara County Air Pollution Control District's emissions factor for uncertified diesel engines for SOx⁶.

The engineering evaluation⁷ lists the source of the emission factor for each criteria pollutant and toxic air contaminant.

Zero emission technology is assumed to have zero emissions. The remainder of this methodology explains the calculation of emissions from diesel fueled engines.

2) Conversions

Emission factors in units of g/kw-hr on the Executive Orders/EPA spreadsheet must be converted. Grams are converted to pounds by a factor of 453.59 grams per pound. Kilowatts are converted to horsepower by a factor of 0.746 Kilowatts per horsepower.

3) Calculating Potential To Emit

The potential to emit, or PTE, of an engine is calculated by multiplying the emission factor by the process rate. The process rate and emission factor must use the same units or a conversion will be needed. The District calculates the maximum pounds per hour, pounds per day, and tons per year of volatile organic compounds, nitrogen oxides, sulfur oxides, particulate matter (PM, PM10, and PM2.5) and carbon monoxide.

The permit to operate (PTO) limits the daily and yearly operation of the engine. These limits are used to calculate the daily and annual PTE from the lbs/hr.

The PTO limits, emission factors, and any control technologies are included on the engineering evaluation for each engine, and are legally enforceable conditions of operation.

⁶ https://www.ourair.org/emission-factors-2/#Default_SBCAPCD_Diesel_Engine_Emission_Factors

⁷ Attachment B Example for Diesel to Diesel projects, Attachment C Example for Diesel to Zero-Emission projects

4) Calculating Emissions in Pounds Per Hour

To calculate emissions in pounds per hour (lbs/hr), the emission factor is multiplied by the kW/hp conversion factor above and the horsepower of the engine, then divided by the g/lb conversion.

Example NOx calculation:

$$(0.190 \text{ g/kw-hr} \times 0.746 \text{ kW/hp} \times 456 \text{ hp}) / 453.59 \text{ g/lb} = 0.1425 \text{ lbs/hr}$$

5) Calculating Emissions in Pounds Per Day

To calculate emissions in pounds per day (lbs/day), the lbs/hr is multiplied by the maximum hours of operation per day on the permit. For a backup stationary emergency generator, the maximum number of hours it could operate for maintenance and testing is 24 hours. The maximum lbs/day equals the lbs/hr multiplied by the maximum hours.

Example NOx calculation:

$$0.1425 \text{ lbs/hr} \times 24 \text{ hours} = 3.42 \text{ lbs/day}$$

6) Calculating Emissions in Tons Per Year

To calculate emissions in tons per year, the lbs/hr is multiplied by the maximum number of hours in a year the engine is permitted to operate for maintenance and testing. That number results in pounds per year. To convert to tons, divide by 2000.

Example NOx TPY Calculation:

$$(0.1425 \text{ lbs/hr} \times 50 \text{ hours}) / 2000 \text{ lbs/ton} = 0.00356 \text{ or } 3.56\text{E-}3 \text{ tons/year}$$

(C) Calculating Toxic Air Contaminants

1) Diesel Particulate Matter

Diesel engines used at a stationary source are subject to the AB 2588 Air Toxics “Hot Spots” Act. Diesel engines are prioritized using the CAPCOA Facility Prioritization Guidelines⁸ based on their maximum PTE at the time the PTO is issued. Engines prioritized less than 1 are considered low priority and no further action is taken unless an application to modify the permit is received. Engines prioritized between 1 and 10 are considered intermediate priority and included on the District’s emission inventory

⁸ CAPCOA Air Toxic “Hot Spots” Program Facility Prioritization Guidelines, August 2016 <http://www.capcoa.org/wp-content/uploads/2016/08/CAPCOA%20Prioritization%20Guidelines%20-%20August%202016%20FINAL.pdf>

submittal to CARB. Engines prioritized over 10 are considered high priority and are processed according to District policy 2.12.1⁹.

2) Calculating Priority Score for Diesel PM

Diesel particulate matter is the main pollutant of concern in the prioritization score. Diesel particulate matter is assumed to equal particulate matter calculated per procedures above. Diesel PM in average pounds per hour is divided by the chronic reference exposure limit. That number is then multiplied by the receptor proximity and a normalization factor of 150 to calculate the chronic priority score.

Example Chronic Priority Score Calculation:

$$[(0.11 \text{ lbs/hr} / 50 \text{ hrs}) / \text{chronic REL}] \times 0.25 \times 150 = 0.00471$$

The diesel PM emissions in lbs/year are multiplied by the unit risk factor, the receptor proximity, and a normalization factor to calculate the cancer priority score.

Example Cancer Priority Score Calculation:

$$5.5 \text{ lbs/year} \times 0.0003 \times 0.25 \times 7,700 = 3.18$$

(D) Calculating GHG Reductions

1. Diesel-to-diesel conversions

GHG emission reductions = { (BSFC [BTU/hp-hr] * HP_baseline [hp] * Usage_baseline [hr/yr]) - (BSFC [BTU/hp-hr] * HP_replacement [hp] * Fuel Efficiency Factor [%] * Usage_replacement [hr/yr]) } / Diesel HHV [BTU/gal] * 134.47 [MJ/gal] * 74.10 [gCO₂e/MJ] / 1,000,000 [gCO₂e/MT-CO₂e] * Quantification Period

- BSFC is the brake-specific fuel consumption
- Diesel HHV is the higher heating value of diesel
- Fuel Efficiency Factor is calculated as follows:
 - If the baseline equipment model year is 2007 or newer, then the factor is 1.
 - If the baseline equipment model year is older than 2007, then the adjustment factor = $1 - ((2007 - \text{Baseline Model Year [down to a minimum of 1980]}) * 0.005)$
- 134.47 MJ/gal is the energy density for diesel, sourced from [LCFS Regulation](#)
- 74.10 gCO₂e/MJ is the carbon intensity for diesel for stationary sources, sourced from [CA-GREET 3.0](#)
- Quantification period = Project Life

2. Diesel-to-electric conversions

⁹ <https://www.fragmd.org/air-toxics>

GHG emission reductions = $\{ \{ (\text{BSFC_baseline [BTU/hp-hr]} * \text{HP_baseline [hp]} * \text{Usage_baseline [hr/yr]}) / \text{Diesel HHV [BTU/gal]} * 134.47 [\text{MJ/gal}] * 74.10 [\text{gCO}_2\text{e/MJ}] / 1,000,000 [\text{gCO}_2\text{e/MT-CO}_2\text{e}] \} - \{ \text{AverageLoad_replacement [kW]} * \text{Usage_replacement [hr/yr]} * 0.0002279 [\text{MT-CO}_2\text{e/kWh}] \} \} * \text{Quantification Period}$

- 0.0002279 MT-CO₂e/kWh is the GHG emission factor for grid electricity, sourced from the [CCI Emission Factor database \(updated May 2019\)](#).
- If applicants do not know their average load, they can calculate it as = Generator Size [kW] * Load Factor [%]
- Quantification period = Project life

8. Attachments

A: Diesel to diesel project example calculations

A-1 Example Executive Order U-R-001-0621

B: Diesel to zero emission technology example calculations