

# Diesel Emission Quantifier (DEQ) Frequently Asked Questions (FAQs)

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Transportation and Climate Division  
Office of Transportation and Air Quality  
U.S. Environmental Protection Agency

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## Administrative

### Logging In

**Question:** What should I do if I'm having trouble logging in?

**Answer:** Try logging in again using your existing username and password. If you encounter further difficulties, try resetting your internet browser's history and cookies before attempting again. If you still cannot log in, create a new username and password.

**Question:** When I try to access the DEQ, I receive an error message.

**Answer:** The DEQ tends to malfunction when many users are logged on at once. The tool resides on an EPA server that may be overwhelmed with heavy user traffic. We advise everyone to plan ahead as traffic will be high around the close of any National Clean Diesel grant competitions. Please try using the DEQ during off-peak hours (early morning or late evening, depending on your time zone, and possibly weekends). If you are unable to access the DEQ at any time, close down your browser and try again without logging in. Also, try using different browsers (the DEQ is configured to be used with IE, Mozilla, and other browsers).

### Saving Results

**Question:** Is there a way to save more than three Fleets using a single login account in the DEQ?

**Answer:** No. However, with the exception of marine vessels, each Fleet allows you to add up to thirty Vehicle Groups. As of now, each marine vessel must have its own separate Fleet (with up to five marine engines per vessel/Fleet). You may open multiple accounts; just use a unique email address each time.

**Question:** When trying to save quantifier results into excel format, it doesn't save properly. It saves as a txt file or comma format. What is the problem?

**Answer:** The DEQ allows users to save both the Summary Results and Detailed Results of a calculation in Excel and CSV formats. Sometimes, however, the files do not get saved properly due to browser and/or computer download settings. If you find that your results saved improperly as a text file, for example, just re-save or rename it with the "xls" extension and it should open just fine. If you need the results in CSV format, we recommend that you save the results in CSV directly from the DEQ, instead of saving the Excel version and then converting to CSV.

### Changing Your Password

**Question:** How do I change my DEQ password?

**Answer:** To change your password, go to [www.epa.gov/cleandiesel/quantifier/](http://www.epa.gov/cleandiesel/quantifier/), select the tab that says "My Account," log in, and click "Edit Profile."

**Question:** I tried changing my DEQ password, editing the password in the “My Account” page as you suggest, and got the following reply when I had put in the new password and retyped it as requested: “Exception on Request. The action user update failed. Variable USER is undefined.” What should I do?

**Answer:** We are working to fix this problem. In the meantime, you should continue to use your old password.

### **Activating Your Account**

**Question:** I submitted registration information but I am unable to log in. Has my account not been activated? Will I receive a notification email when my account is activated?

**Answer:** Yes, you should receive an activation email with a validation link. Your account becomes activated after you click on that link. It is possible that the activation email for the Diesel Emissions Quantifier was caught in your SPAM filter, or you might have mistyped your email address in the registration form. If you are unable to find the email after looking in your SPAM filter, you can try re-registering the account and hopefully you will be able to receive the activation email. Sometimes, the DEQ server does not allow emails that end with “.net”, such as “Comcast.net” or “Verizon.net.” We are working to fix this and apologize for the inconvenience. We suggest that you register with an email that ends with “.gov”, “.edu”, or “.com.”

### **Uses and Limitations**

#### **Light Duty Vehicles**

**Question:** Can the DEQ be used for light duty projects (i.e. diesel pickups)?

**Answer:** The DEQ calculates emission reductions for medium-heavy and heavy-heavy-duty vehicles only. The Motor Vehicle Emissions Simulator (MOVES) model ([www.epa.gov/otaq/models/moves/index.htm](http://www.epa.gov/otaq/models/moves/index.htm)) can be used to calculate emission reductions for both heavy-duty and light-duty vehicles.

#### **Congestion Mitigation and Air Quality Improvement Program (CMAQ)**

**Question:** Can the DEQ be used to estimate benefits for the Congestion Mitigation and Air Quality Improvement Program (CMAQ)?

**Answer:** Yes, the DEQ is an estimation tool that may be used for CMAQ planning purposes.

#### **State Implementation Plans (SIPs)**

**Question:** Why can't the DEQ be used for State Implementation Plan (SIP) calculations?

**Answer:** The DEQ is intended to help in preparing estimated results from retrofit projects. Certain data which can affect emissions, such as temperature and humidity, are entered as default values in the DEQ. Specific inputs are required for the more sophisticated modeling tools approved for SIP and conformity calculations. Please refer to your SIP and conformity guidance document and consult with your EPA Regional Office.

### **Fuel Savings/Fuel Economy Benefits**

**Question:** Does the DEQ provide actual fuel savings or estimates?

**Answer:** The DEQ does not provide information on fuel savings. Based on the user's input of the amount of fuel used, the DEQ will calculate CO<sub>2</sub> emissions reductions for select technology types.

**Question:** Does the DEQ calculate fuel and emissions savings as a result of vehicle replacement or repower?

**Answer:** No, not at this time. However, there is a field that allows a user to input potential fuel savings from replacements/repowers, and the input will then be used to calculate CO<sub>2</sub> emission reductions.

### **CO<sub>2</sub>**

**Question:** Would an engine replacement produce CO<sub>2</sub> (carbon dioxide) emission reductions?

**Answer:** There is a potential for CO<sub>2</sub> reduction with an engine replacement in addition to the amount reduced from burning less fuel, however engines are not currently certified with CO<sub>2</sub> values. In addition, most testing programs do not include CO<sub>2</sub> as a measured pollutant. Hence, CO<sub>2</sub> data is severely limited at this time and we are working to make this clearer on the main DEQ page.

### **Truck Stop Electrification**

**Question:** How are emissions quantification and cost-benefit analysis applied to the use of TSE?

**Answer:** The DEQ is able to quantify TSE benefits for trucks as an Idle Reduction Technology. As you run the calculation, please make the best estimate you can on the number and type of trucks that would utilize the TSE facility, as well as the amount of idling hours reduced.

The DEQ can perform cost effectiveness calculations in two ways. First, it can give you a dollar per ton of pollutant reduced based on your input for the cost of the whole TSE project. You would input this cost before you add the Vehicle Group. Second, the DEQ can give you the dollar per ton of pollutant reduced for the cost each technology and installation (in this case, TSE spaces). You enter these costs

as you are adding a technology to your vehicle group. The first cost effectiveness value appears only on the “Results” screen, while the second appears both on the “Results” screen and the Summary and Detailed results spreadsheets.

### **C3 Marine**

**Question:** Do you envision including C3 marine vessels in the DEQ?

**Answer:** C3 marine engines, or ocean-going vessels, are currently beyond the scope of what is modeled in the DEQ. EPA has provided “Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories” to help users calculate emissions reductions. Please contact EPA’s Helpline at 1-877-NCDC-FACTS or [cleandiesel@epa.gov](mailto:cleandiesel@epa.gov) for assistance with the calculations.

### **Black Carbon**

**Question:** Black carbon, also known as elemental carbon, is a potent climate change agent found in diesel particulate matter. Does EPA have plans to include black carbon in the DEQ so the climate change impacts can be estimated?

**Answer:** The EPA as a whole is still working on reports and guidance regarding black carbon. At this time, there are no definite plans to include black carbon in the DEQ.

## **Defaults and Emission Rates**

### **Defaults**

**Question:** Can you explain the DEQ default values?

**Answer:** The DEQ default values were compiled using various reports and models. Please see the DEQ Default Values document ([www.epa.gov/cleandiesel/documents/420b10035.pdf](http://www.epa.gov/cleandiesel/documents/420b10035.pdf)).

**Question:** How does the DEQ calculate the life of a vehicle? Can that value be overridden?

**Answer:** The DEQ considers the application, engine type, and model year in generating a default lifetime for each vehicle. For on-highway vehicles, the lifetime is set at 30 years; for non-road applications, the lifetime is usually shorter but will vary depending on equipment type and horsepower. Please see Appendix C of the DEQ User’s Guide for detailed breakdowns of vehicle lifetimes. These default lifetimes cannot be overridden.

### **Emission Rates**

In November 2010, emission rates in the DEQ for highway/on-road vehicles were updated using data from the Mobile Vehicle Emissions Simulator (MOVES2010). MOVES2010 incorporates many significant improvements over the old MOBILE6.2

in baseline emissions, activity data, and calculations used to estimate emissions in real-world driving conditions. For current and future highway/on-road projects, it is *highly recommended* that you use the MOVES2010 emission rates by selecting retrofit year of 2011 or later.

**Question:** Which "Year of Retrofit Action" should I use if my project spans several years, for instance 2008 to 2011?

**Answer:** We recommend that you use MOVES numbers by selecting 2011 as the "Year of Retrofit Action" for the entire project, even if the retrofit activity took place before 2011.

**Question:** Which model should I use if my project spans 2008 -2011 and my initial calculations used the old DEQ (MOBILE 6.2) emission rates?

**Answer:** We still recommend that you perform your final calculations using MOVES by choosing 2011 as your "Year of Retrofit Action".

**Question:** My project has been completed and I've already done my calculations using the old DEQ numbers? Do I need to re-run the DEQ using 2011 as the "Year of Retrofit Action"?

**Answer:** No. If your project is closed and you have already turned in your final report, there is no need to re-run the DEQ.

**Question:** If I want to continue using the old DEQ MOBILE 6.2 emission rates, will I run into problems?

**Answer:** You will not run into any problems using the DEQ. However, using the old MOBILE 6.2 numbers for your calculations will severely under estimate your emission reductions.

## Calculations and Units

### Calculations

**Question:** In calculating lifetime benefits, does the DEQ consider the remaining life of the vehicle or of the emission control device?

**Answer:** Lifetime calculations are based on the remaining life of the vehicle, not the emission control device. EPA assumes that once a vehicle is retrofitted, it will remain retrofitted until the vehicle is retired.

**Question:** Why is the lifetime calculation presented in terms of a vehicle's *remaining* life instead of its *whole* lifetime? For instance, I am replacing a twenty-year-old school bus with a brand new one. The old bus has ten years left while the new one

has thirty. The DEQ will show lifetime emission benefits for only those ten remaining years. Isn't this underestimating the emissions benefit for my new bus?  
**Answer:** The DEQ is showing emissions benefit for only the remaining life because after the tenth year, the old bus would have been replaced anyway. Therefore, you are getting credit for only those ten years of early attrition.

## Units

**Question:** Does the DEQ give results in metric tons or short tons?

**Answer:** Short tons.

**Question:** Can the DEQ separate Particulate Matter (PM) by PM<sub>2.5</sub> and PM<sub>10</sub>?

**Answer:** No. The DEQ only calculates PM<sub>2.5</sub>.

## Use in the Grant Process

### Choosing a Calculator

**Question:** If the DEQ cannot accommodate my project, what are some other calculation tools I can use?

**Answer:** You may utilize the following alternative methods for calculating emission reductions:

1. Motor Vehicle Emission Simulator (MOVES) (on-road vehicles)  
[www.epa.gov/otaq/models/moves/index.htm](http://www.epa.gov/otaq/models/moves/index.htm)
2. Nonroad Model (nonroad engines, equipment, and vehicles) -  
[www.epa.gov/otaq/nonrdmdl.htm](http://www.epa.gov/otaq/nonrdmdl.htm)
3. SmartWay FLEET Model - [www.epa.gov/smartway/partnership/](http://www.epa.gov/smartway/partnership/)

### Cost Effectiveness

**Question:** How is cost effectiveness determined?

**Answer:** The DEQ calculates two types of cost effectiveness, but both calculations are simple and can be done by hand.

First, the DEQ calculates **Total Cost Effectiveness** by summing up the financial inputs you make on this first screen of the DEQ calculation. This is the **Total Project Cost**.

## Enter Fleet Information

Start Over

New

**Fleet Name**

**Fleet Type**

**State**

**Do you want to estimate the total cost effectiveness of the project?** Yes  No

Total cost effectiveness numbers are based solely on the user inputs below

EPA \$ <input type="text" value="200000"/>	Private \$ <input type="text" value="2300"/>	Other \$ <input type="text" value="3333"/>
Other Federal \$ <input type="text"/>	Match/Lev. \$ <input type="text" value="25000"/>	Unknown \$ <input type="text" value="1000"/>
CMAQ \$ <input type="text"/>	SEP \$ <input type="text" value="0"/>	State \$ <input type="text" value="0"/>
Local \$ <input type="text" value="1500"/>		

Next, you will make all the inputs for your vehicles and click “Quantify Emissions.” The DEQ will sum up the lifetime tons reduced across all the vehicles based on pollutant (NO<sub>x</sub>, PM, HC, CO, and CO<sub>2</sub>). This is the **Total Lifetime Tons Reduced**. Finally, the DEQ divides the **Total Project Cost** by the **Total Lifetime Tons Reduced** for each of the five pollutants, performing individual divisions for each pollutant. This gives five results in dollars/ton and is shown *on the bottom of the Emission Results Page ONLY*. It is currently NOT shown on the Excel or CSV DEQ outputs for download. However, this is a relatively simple calculation that can be done by hand after a DEQ run is completed.

## Emissions Results:

The results are broken into four sections: Emissions Results: Annual, Daily; Emissions Results: Lifetime; Funding Sources; and Detailed Results. The data that appear in the Results tables are an aggregation of the emissions from all vehicle groups and technologies that you entered. For information on the results, refer to the User's Guide, 3. Emission Results Screen.

[Start Over](#)

### Idle Reduction

Fleet

- **Fleet Type** On Highway / Non-road
- **State** Kentucky

[Edit Fleet](#)

[Summary Emissions Results](#)

[Detailed Results](#)

[Download Results](#)

[Health Benefits](#)

Annual	NOx (tons/year)	PM (tons/year)	HC (tons/year)	CO (tons/year)	CO2 (tons/year)	Diesel- Equivalent (gallons/year)
<b>Baseline of Entire Fleet</b>	64.5098	2.8286	2.5229	16.2920	370.0074	33,334.0000
<b>Baseline of Engines Retrofitted</b>	64.5098	2.8286	2.5229	16.2920	370.0074	33,334.0000
<b>Percent Reduced (%)</b>	0.0%	25.0%	40.0%	30.0%	0.0%	0.0%
<b>Amount Reduced Per Year</b>	0.0000	0.7072	1.0092	4.8876	0.0000	0.0000

  

Daily	NOx (kg/day)	PM (kg/day)	HC (kg/day)	CO (kg/day)	CO2 (kg/day)	Diesel- Equivalent (gal/day)
<b>Kilograms Reduced Per Day (kg/day)</b>	0.0000	1.7576	2.5082	12.1478	0.0000	0.0000

  

Lifetime	NOx (tons)	PM (tons)	HC (tons)	CO (tons)	CO2 (tons)	Diesel- Equivalent (gallons)
<b>Amount Emitted After Retrofit, Retrofitted Engines</b>	702.5113	23.1029	16.4845	124.1940	4,029.3806	363,007.2600
<b>Amount Emitted After Retrofit, Entire Fleet</b>	702.5113	23.1029	16.4845	124.1940	4,029.3806	363,007.2600
<b>Capital Cost Effectiveness (\$/ton), Retrofitted Engines</b>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total Cost Effectiveness (\$/ton), Retrofitted Engines</b>	\$0.00	\$129,853.95	\$90,994.58	\$18,787.80	\$0.00	\$0.00

**Note:** The lifetime results are dependent on each vehicle group's remaining life. To determine the remaining life for each vehicle group, divide the lifetime results by the annual results using the Detailed Results tables below.

[↑ top of page](#)

For questions, technical assistance, or more information: [Contact Us](#)

Second, the DEQ calculates Capital Cost Effectiveness by taking the sum of the Unit Cost and Installation Cost of each technology (shown below), and dividing that by the **Total Lifetime Tons Reduced** for each of the five pollutants. This value is displayed both on the Emissions Results page and the Excel and CSV DEQ outputs for download.

### Enter Fleet Information

[Start Over](#)

Idle Reduction
Fleet

- **Fleet Type** On Highway / Non-road
- **State** Kentucky

[Edit Fleet](#) | [Start Over](#)

---

Long Haul Idle
Vehicle Group

- **Quantity** 2
- **Type** On Highway
- **Target Fleet** Long Haul
- **Class/Equipment** Class 8a (33,001-60,000)
- **Model Year** 1996
- **Retrofit Year of Action** 2012
- **Fuel Type** Regular Diesel (ULSD), 15 ppm
- **Fuel Volume** 33334
- **Veh. Miles Traveled** 100000
- **Idling Hours** 2400

New Technology
Technology

Technology Type

Technology

Apply To  (out of 2) with no technology

**Reduction by Pollutant**

NOX %

PM %

HC %

CO %

CO2 %

Install Cost  \$ per vehicle

Unit Cost  \$ per vehicle

[Save Technology](#) | [Cancel](#)

[Edit Group](#) | [Delete](#)

## Health Benefits Counties

**Question:** How do I choose the counties in which the emission reductions take place?

**Answer:** For a DEQ calculation, you are required to choose one state where the retrofits take place. For projects that span multiple states, such as long-haul trucks and locomotives, please choose the state where the majority of the emissions are located.

Once you complete the DEQ run and get to the DEQ Health Benefits Module, you will be allowed to allocate emission reductions among up to five counties (across multiple states) for the purpose of estimating monetary benefits. Please use your best judgment, based on your understanding of where the emission reductions will take place, to determine which counties should be included in the benefit estimates. Note that the Health Benefits Module is not asking whether pollution from one county is drifting into another; it's asking where the vehicles that are reducing their emissions are operating.

**Question:** My county is “flagged.” What does that mean?

**Answer:** The Health Benefits Module will flag results for counties where there may be an underestimate or an overestimate of benefits due to the transport of emissions into or out of the county.

For counties where a large quantity of emissions are flowing **into** the county, the results are flagged with the following message: *Benefits estimates are “flagged” for this county, indicating that we have less confidence in these results due to a large amount of inter-county transport of emissions. The impacts estimation tool may be overestimating the benefits for emissions reduction projects in this county, because it has relatively few emissions compared to surrounding areas. As a result, this county is likely to be a net importer of diesel emissions, and air quality is significantly affected by emissions in upwind counties. Please take this increased uncertainty into account when interpreting your results.*

For counties where a large quantity of emissions are flowing **out of** the county, the results are flagged with the following message: *Benefits estimates are “flagged” for this county, indicating that we have less confidence in these results due to a large amount of inter-county transport of emissions. The impacts estimation tool may be underestimating benefits for emissions reduction projects in this county, because it has a relatively high density of emissions compared to surrounding areas. As a result, this county is likely to be a net exporter of diesel emissions, and many of the benefits of reducing these emissions are likely to take place in*

*downwind counties. Please take this increased uncertainty into account when interpreting your results.*

**Question:** When I enter the same data for vehicles and retrofit projects in different counties, I get different benefits. Why?

**Answer:** One of the main factors determining magnitude of health benefits associated with a given emissions reduction is the proximity of the emissions to people. If a certain emissions level is assigned to a larger census tract, it will result in a lower ambient concentration as the pollution is being spread over a larger area. The opposite is true as well. Assigning emissions to a smaller census tract will result in higher average concentrations.

In addition, if emissions are assigned to a less populated census tract, fewer people will be exposed to the resulting concentration of air pollution and the population-weighting at the county scale will predict a lower concentration, and thus, a lower ratio. Again, the opposite is true: emissions assigned to higher-populated tracts leads to a higher concentration and ratio.

### **Pollutants and Health Effects**

**Question:** What health effects of diesel PM are included in the monetary calculation of the Health Benefits Module?

**Answer:** The monetary values for the benefits of reducing diesel emissions are based on avoided incidences of the following health effects:

- Premature mortality
- Chronic bronchitis
- Acute bronchitis
- Upper and lower respiratory symptoms
- Asthma exacerbation
- Nonfatal heart attacks
- Hospital admissions
- Emergency room visits
- Lost work days
- Minor restricted-activity days

**Question:** Does the DEQ estimate reductions in total particulate matter or fine particulate matter, since the Health Benefits Module aspect of the DEQ uses only PM<sub>2.5</sub> in its calculation?

**Answer:** The DEQ estimates reductions in PM<sub>2.5</sub>, as does the Health Benefits Module. For additional information about this conversion, please refer to the Health Benefits Methodology ([www.epa.gov/cleandiesel/documents/420b10034.pdf](http://www.epa.gov/cleandiesel/documents/420b10034.pdf)).

**Question:** Is diesel particulate matter the only pollutant considered in the Health Benefits Module?

**Answer:** This module estimates the benefits from reducing only the portion of diesel particulate matter that is fine particulate matter (PM<sub>2.5</sub>). There are likely benefits from reducing other pollutants, such as ozone and air toxics, but the DEQ is not able to quantify these benefits at this time.

### **Calculation, Use, Purpose, and Accuracy**

**Question:** How are benefits of reducing diesel particulate matter calculated?

**Answer:** The Health Benefits Module uses a county-scale “look-up table” within the larger DEQ tool. The look-up table includes estimates of monetary benefits per ton reduced of PM<sub>2.5</sub> reduced for each county in the United States. The user answers a set of questions about the type of engine being controlled, the emission control(s) used, and the location of the emission reductions. Once the DEQ estimates the emission changes, users can choose to have the Health Benefits Module estimate the health benefits of reductions in fine particulate (PM<sub>2.5</sub>) emissions. Those results are found in the look-up table and the combined monetary values of avoided mortality and morbidity (i.e. non-fatal illness) are presented in tabular format for the counties the user identified.

EPA has developed look-up tables for total diesel PM sources, as well as for on-road diesel sources and non-road diesel sources. The look-up table for total diesel PM sources was developed as part of the Quality Assurance for this module and are the sum of the on-road and non-road look-up tables. These tables and more are available in the Health Benefits Methodology located on the DEQ website.

**Question:** How can this information be used for?

**Answer:** The Health Benefits Module is intended as a helpful tool in preparing and understanding estimates for specific emission diesel reduction projects. It can be used to make informed decisions about the benefits of various diesel retrofit options, provide an estimate of benefits for EPA grant applications, and build public support for such projects. However, it should not be used in the calculation of emission reductions for State Implementation Plan (SIP) or conformity determination.

**Question:** What does the Health Benefits Module provide?

**Answer:** This module provides information on the health benefits of reducing exposure to diesel PM emissions. This new component of the DEQ allows users to estimate diesel emission reductions and the resulting health benefits.

The DEQ requires users to input detailed information regarding the emission sources they are controlling, the types of controls being applied, the number of sources being replaced, retrofitted or otherwise controlled, and the year in which the controls will take effect. The DEQ then calculates the emission reductions for particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), hydrocarbons (HC), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>).

The Health Benefits Module allows users to identify the counties where the emission reductions are taking place and to estimate the monetary impact of the resulting health benefits. These estimates are based solely on the change in fine particle concentrations and do not reflect changes in exposure to any other pollutants, including ozone or hazardous air pollutants. Users can save and export files summarizing the emissions and health effects estimates. There is also a Health Benefits Methodology that explains the methodology used to estimate the health benefits and the limitations of the estimates.

**Question:** How accurate are the Health Benefits Module estimates?

**Answer:** The benefits generated by this module reflect reductions only in fine particulate matter. They do not include benefits from the reduction of other pollutants, including air toxics.

The results also do not include the impact of emissions sources from neighboring countries (i.e., Canada or Mexico), so the results for states bordering either of these countries do not reflect these potentially significant sources of transported emissions.

The methodology used to estimate the health benefits for this project was peer reviewed both inside and outside EPA and incorporates many suggestions by the peer reviewers. It includes data and modeling from several existing EPA tools: the National Emissions Inventory (NEI), the National Air Toxics Assessment (NATA), and the Environmental Benefits Mapping and Analysis Program (BenMap).

The methodology is most accurate in a relative sense, such as when comparing benefits among different locations or retrofit projects. The estimates are based primarily on county-level data and do not capture smaller-scale variability in air quality, exposure, or benefits, such as living very near a retrofitted diesel source or regularly riding a retrofitted school bus.

For a complete discussion of the accuracy of these estimates, please see the chapter in the methodology document titled “Uncertainties, Limitations, and Quality Assurance.”

## **Cost Benefits (Explanation and Troubleshooting)**

**Question:** Why does the Health Benefits Module use annual costs and benefits?

**Answer:** Diesel retrofit projects tend to be capital-intensive in the first year with the purchase and installation of new equipment or parts. The benefits, however, are spread out over many years as people receive health benefits from the reduced emissions from the new or retrofitted engine. In order to adequately compare costs and benefits, this difference in timeframes must be accounted for. We annualize the costs and the benefits so the user can tell at a glance whether the benefits outweigh the costs on an annual basis. These annualized costs and annual benefits provide an indication of the scale and magnitude of the expected costs and benefits over the lifetime of the project.

Annualized costs are not the out-of-pocket costs in the first year, but are what would be paid each year if the out-of-pocket costs were distributed over the life of the engine. This is similar to the way a mortgage distributes costs over 30 years. If you took out a loan to purchase the retrofit technologies, the annualized costs are roughly what the loan payments might look like.

Lifetime costs and benefits can be estimated by multiplying the annual costs or benefits by the number of remaining years in the lifetime of the retrofitted engine. While the lifetime estimate does not take into account a number of factors such as discount rates for benefits in future years, population or income growth, and others, it does provide a rough estimate.

**Question:** Why are there no costs in the “Results” table of the Health Benefits Module?

**Answer:** The Health Benefits Module estimates the annualized costs from the unit cost (equipment) and installation costs of the project. These values are entered at the bottom of the DEQ input section titled “Apply a Technology.” If the user does not enter the cost information, no cost information will appear in the benefits results table.

In addition, funding information may be entered in the section titled “Click Here to Enter Funding Information.” These are assumed to be total project costs, including overhead, and are not used to estimate annual costs.

**Question:** I am trying to determine the health benefits for a marine engine repower project. While there are significant PM reductions in PM nonattainment counties, the benefits come up \$0. What is the problem?

**Answer:** The health benefits calculation depends on the PM reduction in tons. Sometimes, that reduction may be lower than you realize and the benefits for the chosen counties may be very close to zero that they're accidentally truncated. Please download the **Summary Results** of both the DEQ calculation and the Health Benefits calculation in Excel or CSV and send it to [Cleandiesel@epa.gov](mailto:Cleandiesel@epa.gov)

## Other

**Question:** Where can I get more information about the health benefits of reducing particulate matter in diesel emissions?

**Answer:** For information about particulate matter, visit [www.epa.gov/air/particlepollution](http://www.epa.gov/air/particlepollution)

## Data Entry

### Multiple Technologies

**Question:** Is there a scenario for using the DOC+CCV (Diesel Oxidation Catalyst + Closed Crankcase Ventilation) or DPF+CCV (Diesel Particulate Filter + Closed Crankcase Ventilation) combination technology? How about CCV by itself?

**Answer:** CCV is included under "Emission Control Devices" as DOC+CCV, or DPF+CCV. It is not listed as a stand-alone retrofit technology. If you are using CCV as a stand-alone technology, select "Other Emission Control Devices" from the "Technology" menu and enter the reduction percentages as given by the CCV manufacturer.

**Question:** Is there an option for combined technologies such as engine repower with DOC or DPF?

**Answer:** Some combined technologies are not available together because they cannot or should not be installed on the same vehicle (i.e. DPFs and Partial Flow filters). However, there are many technologies that can be installed together and you can add them to the same vehicle(s). This is done by first selecting one technology and adding it to your vehicle group and then selecting another and saving it to the same vehicle group. Work slowly and pay close attention to how the multiple technologies are displayed on the screen. If you have multiple vehicle groups, be aware that after adding a technology, the page always reloads to show the first vehicle group, so remember to scroll down if you're working on a subsequent one.

## Fuel Type

**Question:** With our retrofit project, we will be switching from one fuel type to another. How is this handled in the DEQ?

**Answer:** First, go to the “Enter New Vehicle Group Information” section and enter the vehicle information. Then select the fuel type that was being used before the retrofit.

Under “Apply a New Technology to the Vehicle Group,” apply as many technologies as you need to the vehicle(s). One of the “Technology Type” options is “Fuel Options,” so select the fuel that the vehicle(s) will be using after the retrofit.

## **Replacement**

**Question:** Does the DEQ also calculate emissions reductions for engine replacements?

**Answer:** Yes. Under “Technology Type,” select “Engine Replacement/Repower.” Then under “Technology” select “Engine Replacement.”

**Question:** Can the DEQ be used to calculate emission reductions by replacing a diesel engine with electric technology?

**Answer:** Replacing a diesel engine with an electric technology would result in zero diesel emissions. In this case, you would enter all the fleet information and when you add a Retrofit Technology, select “Emission Control Devices,” for Technology Type, and then select “Other Emissions Control Devices” for Technology. Then, in the “Reduction by Pollutant”, you can enter 100% for each of the pollutants. This allows the DEQ to calculate your project with all of the diesel emissions removed.

## **Uncertainty, Missing Information, Averaging, and Diverse Fleets**

**Question:** We have a project that has a variety of fleet components, but we are unsure of the exact vehicles that will be in the program. What should we use for the DEQ calculations?

**Answer:** If you are unsure of the exact fleet, you should use your best judgment and any past history you have with such a program to make estimates in the DEQ.

**Question:** What if I don’t have all of the information required to use the DEQ?

**Answer:** The DEQ offers some default values for various equipment and retrofit technologies in the DEQ Default Values document ([www.epa.gov/cleandiesel/documents/420b10035.pdf](http://www.epa.gov/cleandiesel/documents/420b10035.pdf)). Some of these defaults can be self-populated as you run the DEQ (but not all, so remember to check the defaults document). When you add a Vehicle group, there will be a link called “Get Default Values,” which will populate certain fields if you click on it. You can also make estimates using different scenarios if certain data (e.g., gallons of fuel used annually) are not readily available. However, we do encourage everyone to

use real-life data and challenge fleet owners and operators to have records of data for their vehicles.

**Question:** For off-road vehicles, DOC unit cost varies depending on engine size. Can we average the costs per unit or must we do a separate run for each application?

**Answer:** You can either use one unit or average them, depending on how you will use your data and how precise you want your results to be.

**Question:** How do you estimate emissions for a fleet with multiple, diverse vehicles? Must a separate calculation be performed for each vehicle?

**Answer:** It depends on your preference and the desired precision of the results. You may generate a report for each vehicle or group of similar vehicles. Alternately, you may run a single report using ‘average’ inputs to minimize the number of runs. For example, if similar vehicles are spread evenly over model years 1998 -2003, they may be averaged together, entered as 2001, and run as a single report. For more information on the best ways to group vehicles and still ensure accuracy, refer to the Appendix of this document.

## **Fleets**

**Question:** How many vehicles make a fleet?

**Answer:** One or more vehicles, engines, and/or equipment (i.e. stationary generator).

**Question:** Which inputs are for a single vehicle and which are for the entire fleet?

**Answer:** All of the inputs except for Fuel Volume should be entered for a single vehicle/engine. Fuel Volume should be entered as a total for the entire Vehicle Group.

## **Baseline Emissions**

**Question:** How can I calculate baseline emissions using the DEQ?

**Answer:** To calculate baseline emissions, simply enter the information about your fleet, and then when you add a technology, choose “Emission Control Devices” for Technology Type and “Other Emission Control Devices” for Technology. This will give you zero percent reductions and the results will simply be the baseline engine emissions. **However**, if you do not add any technology to your fleet, the DEQ will calculate the baseline emissions and you can view it on the Emission Results Screen, but the results cannot be downloaded as a DEQ Summary Results spreadsheet.

## Idling Hours

**Question:** Are idling hours included in the non-road usage rate or are they just ignored?

**Answer:** Please include idling hours as part of the engine's usage rate.

## Maintenance and Operating Costs

**Question:** Why are maintenance and operating costs not entered into the DEQ?

**Answer:** These costs associated with a retrofit project do not have specific input fields in the DEQ, however, you may choose to include them as part of the total project cost, which is entered as you first begin to create a fleet.

## Vehicle Definitions and Classes

**Question:** Where can I find the definition of a bus and does it include hotel/airport shuttles?

**Answer:** For highway vehicles, only medium heavy-duty and heavy heavy-duty vehicles can be calculated in the DEQ (Classes 5-8). Shuttles are usually Class 4 or 5, so be sure to double check your fleet. Only school buses and transit buses have separate categories. For a further definition of vehicles and weight classes, please see the DEQ Default Values document ([epa.gov/cleandiesel/documents/420b10035.pdf](http://epa.gov/cleandiesel/documents/420b10035.pdf)).

**Question:** Where can I find the definition of different classes of vehicles? Are they DOT classes? Are there any specifications for classes specifically related to DERA?

**Answer:** For highway vehicles, only medium heavy-duty and heavy heavy-duty vehicles can be calculated. See below for class breakdowns their respective gross vehicle weight rating (GVWR).

- Class 5; 16,001 - 19,500 lbs GVWR
- Class 6; 19,501 - 26,000 lbs GVWR
- Class 7; 26,001 - 33,000 lbs GVWR
- Class 8a; 33,001 - 60,000 lbs GVWR
- Class 8b; 60,001 lbs GVWR and over

For further definitions of vehicles and weight classes, please see the DEQ Default Values document ([epa.gov/cleandiesel/documents/420b10035.pdf](http://epa.gov/cleandiesel/documents/420b10035.pdf)).

## Verification Information

**Question:** Does EPA have a listing of engine family names that are approved for a verified product or system?

**Answer:** No, unlike CARB, EPA does not issue a list of engine family names for each technology verification. However, applicants should refer to the technology listing on the verified list for specific engine model/application information, as well as general operating criteria. Engine certification data, including engine family names, are available at [www.epa.gov/otaq/certdata.htm#largeng](http://www.epa.gov/otaq/certdata.htm#largeng)

## **Input Errors**

### **Vehicle Groups**

**Question:** What if I have vehicles in both on-road and off-road applications?

**Answer:** The DEQ can support multiple Vehicle Groups, including a mix of on-highway and non-road in the same Vehicle Group and Fleet. However, for marine engines, each marine vessel must be its own separate Fleet (with up to five engines per Fleet/vessel).

**Question:** The quantifier is not allowing me to update Fleet information. The error happens when I try to add a vehicle group. I get this message: *“An Unexpected Error has Occurred. We are sorry, the Diesel Emissions Quantifier has experienced an unexpected error. The details of this error have been logged and the development team has been notified. If you left your browser inactive for over 30 minutes, this error is due to your session timing out.”* What should I do?

**Answer:** If you are logged into a user account, one potential remedy would be to logout, close down the browser and then log back in again. You can also try running the quantifier without signing.

**Question:** Is there a limit to how many vehicle groups we can input into one Fleet? I have 47 entered and when I try to quantify emissions it says the DEQ is experiencing an error.

**Answer:** Ideally, each Fleet can support up to 100 Vehicle Groups. However, most users see an increased number of crashes and malfunctions when there are more than 30 Vehicle Groups per Fleet. We recommend that you keep it to 30 or fewer.

### **Model Year**

**Question:** Sometimes when I am trying to enter my Vehicle Group information, I cannot select the model year I want for my vehicles.

**Answer:** Depending on the type of vehicle, the DEQ may assume that only certain model years are allowed to be retrofitted. In this case, you should select the closest model year to your fleet, which will have an effect on the estimated results.

## Horsepower

**Question:** The DEQ does not have the horsepower that I need for a calculation. The nearest available horsepower option is either too high or too low. What should I do?

**Answer:** We still recommend using the nearest available horsepower option for the vehicles involved. Please understand that at this time, the DEQ does not have all emission factors for all available horsepower of non-road equipment. Data collection and approval on emission factors may take years, so please understand that the DEQ cannot readily perform all calculations at this time.

## Replacement (Engine and Vehicle)

**Question:** I can't find an option to run a vehicle replacement. What should I do?

**Answer:** The quantifier does not have an option for vehicle replacements. To calculate emissions reductions for a vehicle replacement project, please use the engine replacement option from the quantifier's technology list.

## Technologies

**Question:** If idle reduction cannot be selected for off-road equipment, how do you quantify emission reductions for automatic shutdown devices on off-road vehicles?

**Answer:** At this time the DEQ does not support idling strategies in non-road engines. You are welcome to consult other calculation methods.

**Question:** When using the Diesel Emissions Quantifier, only verified technologies are available on the technology pull-down menu. Are Emerging Technology applicants supposed to manually insert projected emissions reductions in the HC, PM, CO, etc. areas?

**Answer:** Yes. Please refer to the Emerging Technology RPF or RFA for specific instructions.

**Question:** I'm having trouble calculating percent emission reductions for several technologies (including direct fired heaters which results in 0%). What might be the problem?

**Answer:** Go back and check your inputs for errors. For example, if the "Idle Hours Reduced" is blank, then you need enter the number of idle hours reduced per vehicle per year.

## Fuels

**Question:** What if the DEQ doesn't list the same fuel blends that we have, like high blends of Biodiesel plus ULSD?

**Answer:** The DEQ results are estimates, so users are advised to select the option that most closely approximates their real-world application.

**Question:** The DEQ has selections for B-20 and B-100 but nothing in between. The National Clean Diesel RPF indicates that any blend of Biodiesel (B-5 to B100) is eligible. Are any blends eligible or just B20 and B100?

**Answer:** Yes, any blend of Biodiesel is eligible. However, the DEQ at this time is not able to accommodate blends other than B20 and B100. Realize that the DEQ is simply a tool for estimates and you are welcome to seek out other tools that may be more geared toward fuels.

**Question:** Suppose a company has a total of 20 trucks and has decided to replace the engines in 10 of them. For the combined fuel volume for the fleet, do we enter the total fuel consumed by the 20 trucks or by just the 10 of them which are going to be replaced?

**Answer:** In the case you described, you would create a Vehicle Group of 20 vehicles in the DEQ and then apply the emission technology (in this case, an engine replacement) to 10 out of the 20 vehicles. For Fuel Volume, you would enter the combined fuel consumption for the entire Vehicle Group (all 20 trucks).

### Currently Documented Errors

Please note that the DEQ is an estimation tool only and users may not be able to quantify all possible scenarios. EPA suggests you familiarize yourself with the data that goes into the DEQ (as outlined in the Appendices of the DEQ User's Guide, the Health Benefits Manual, and the current methodologies for ports at [www.epa.gov/cleandiesel/publications.htm#ports](http://www.epa.gov/cleandiesel/publications.htm#ports)). If the DEQ is not working for your scenario, you may want to download the emissions factors from [www.epa.gov/otaq/nmim.htm](http://www.epa.gov/otaq/nmim.htm) to make your own calculations. You can also use other available data sources.

If you are using the DEQ for a DERA application, you can use any documented methodology to calculate emission reductions as long as you cite the source in the application.

The instructions to use the DEQ can be found in the DEQ User's Guide ([www.epa.gov/cleandiesel/documents/420b10033.pdf](http://www.epa.gov/cleandiesel/documents/420b10033.pdf))

We have documented some common errors and suggested work-around solutions below. If the problem you are encountering is not listed, we recommend logging out, restarting the DEQ, and trying again. If the error persists more than twice, please send

us your inputs and take a screen shot or copy and paste the error message into an email.

**Problem:** I can't log in to my user account.

**Solution:** Please create a new user account.

**Problem:** My previously saved Fleets are not working.

**Solution:** Due to updates to the DEQ structure, some previous scenarios may no longer work properly. If you encounter this situation, please delete the old Fleets and recreate them. In some cases, users are able to access a saved Vehicle Group, but not be able to quantify it. This can be fixed by deleting the existing technology, re-entering it, and then clicking on "Quantify Emissions."

**Problem:** I can't find Total Cost Effectiveness on the exported results spreadsheets.

**Solution:** This value is available on the Summary Results screen, but not available on the spreadsheets yet. Please refer to the page directly after clicking "Quantify Emissions," or calculate yourself:

- The DEQ calculates Total Cost Effectiveness by taking the total funding for a scenario and dividing it by the total Lifetime Tons Reduced of each pollutant.
- The DEQ calculates Capital Cost Effectiveness by taking the total Unit Cost and Installation Cost for each run and dividing that by the Lifetime Tons Reduced for each pollutant.

**Problem:** I am unable to select the correct Retrofit Year when I enter my older vehicles.

**Solution:** Choose a Model Year that is within 28 years of the Retrofit Year. For example, if you use a model year of 1990 instead of 1981, the DEQ will allow you to choose a retrofit year of 2009.

**Problem:** The Lifetime Emissions equal the Annual Emissions.

**Solution:** The agency standard regarding diesel vehicles is that they should be retired after 28 years. Although many vehicles are used for significantly longer periods of time, the DEQ assumes that if a vehicle is over 28 years of age, its remaining lifetime is just one year, so the Lifetime Emissions equal the Annual Emissions. One way to work around this issue is to estimate the remaining life of the vehicle yourself and multiply the Annual Emissions accordingly.

## Appendix: Grouping Vehicles for Calculations in the DEQ

The Diesel Emissions Quantifier is designed to give emissions reductions for a variety of fleets and retrofit technology options. However, you may encounter a project with a multitude of vehicle and engine types. For instance, if your project is replacing 20 school buses with unique model years ranging from 1980 to 2000, **you do not** have to run the DEQ twenty different times for each individual model year. You can easily divide those 20 buses into two or three groups and run the DEQ two or three times. The following guidelines are based on the On Highway and Non-road emission standards (see Reference Links):

- 1) First, separate the DEQ Calculation Groups for multi-sector projects into three categories, On Highway, Non Road, and Marine.
  - a) On Highway.
    - i) First, group all on-highway vehicles into their respective Target Fleets:
      - (1) City/County Vehicle
      - (2) Delivery Truck
      - (3) School Bus
      - (4) Transit Bus
      - (5) Refuse Hauler
      - (6) Emergency Vehicle
      - (7) Long Haul
      - (8) Short Haul
    - ii) Within each Target Fleet, group vehicles based on the Class/Equipment:
      - (1) School Buses
      - (2) Transit Busses
      - (3) Class 5
      - (4) Class 6
      - (5) Class 7
      - (6) Class 8a
      - (7) Class 8b
    - iii) Next, divide the Class/Equipment groups by the following Model Year ranges (based on the On-Highway PM level emission standards ) :
      - (1) Pre-1987
      - (2) 1988-1990
      - (3) 1991-1993
      - (4) 1994-1997
      - (5) 1998-2003
      - (6) 2004-2006
      - (7) 2007-2010

- iv) Finally, within each Model Year group, divide your vehicles based on the type of retrofit technology that will be applied (i.e. Diesel Oxidation Catalyst + CCV, Engine Replacement, etc)
- b) Non-Road (non-marine vessels/engines)
- i) First, group all Non Road vehicles into their respective Target Fleets:
    - (1) Agriculture
    - (2) Construction
    - (3) Ports and Airports
    - (4) Rail
    - (5) Stationary
  - ii) Within each Target Fleet, divide the vehicles based on the Class/Equipment (too many to list here, and realize that some non-road equipments can overlap so you could have fewer groups than you realize).
  - iii) Within each Class/Equipment group, divide by the following Horsepower/Model Year combinations (based on Non-road emission standards for NO<sub>x</sub>, PM, NMHC+NO<sub>x</sub> and CO):
    - (a) <11 hp and pre-2000 (Tier 0)
    - (b) <11 hp and 2000-2004 (Tier 1)
    - (c) <11 hp and 2005-2010 (Tier 2)
    - (d) 11 ≤ hp <25 and pre-2000
    - (e) 11 ≤ hp <25 and 2000-2010
    - (f) 25 ≤ hp <50 and pre-1999
    - (g) 25 ≤ hp <50 and 1999-2003
    - (h) 25 ≤ hp <50 and 2004-2010
    - (i) 50 ≤ hp < 100 and pre-2004
    - (j) 50 ≤ hp < 100 and 2004-2010
    - (k) 100 ≤ hp < 174 and pre-2003
    - (l) 100 ≤ hp < 174 and 2003-2010
    - (m) 174 ≤ hp < 301 and pre-1996
    - (n) 174 ≤ hp < 301 and 1996-2002
    - (o) 174 ≤ hp < 301 and 2003-2010
    - (p) 301 ≤ hp < 603 and pre-1996
    - (q) 301 ≤ hp < 603 and 1996-2000
    - (r) 301 ≤ hp < 603 and 2001-2010
    - (s) 603 ≤ hp < 750 and pre-1996
    - (t) 603 ≤ hp < 750 and 1996-2001
    - (u) 603 ≤ hp < 750 and 2002-2010
    - (v) > 750 hp and pre-2000
    - (w) > 750 hp and 2001-2010
  - iv) Finally, within each Horsepower/Model Year group, divide your vehicles based on the type of retrofit technology that will be applied (i.e. Engine Replacement, Engine repower, Hybrid Replacement, etc.)

Reference Links:

1. On-Highway Heavy Duty Compression Ignition Exhaust Certification Emission Standards  
[www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm](http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm)

2. Non Road Compression Ignition Exhaust Emission Standards  
[www.epa.gov/otaq/standards/nonroad/nonroadci.htm](http://www.epa.gov/otaq/standards/nonroad/nonroadci.htm)