



**Greenhouse Gas Reduction Fund  
Frequently Asked Questions for the  
Transit and Intercity Rail Capital Program  
Quantification Methodology for FY 2018-19**

**December 21, 2017**

**1. How do I estimate greenhouse gas emission reductions when replacing a locomotive with a newer, more fuel-efficient locomotive?**

The TIRCP Quantification Methodology estimates greenhouse gas emission reductions using a well-to-wheel approach, which is based on fuel usage. For the Cleaner Vehicles/Technology/Fuels project type, greenhouse gas emission reductions are estimated using the improved fuel efficiency.

Annual fuel for a new, more fuel-efficient locomotive ( $AnnualFuel_{new}$ ) can be estimated based on fuel savings percent (%) demonstrated by manufacturer data for the new fuel-efficient engines using Equation 1.

**Equation 1: Annual Fuel for a New Locomotive**

$$AnnualFuel_{new} = AnnualFuel_{old} \times (1 - Fuel\ Savings\ \%)$$

Where,

$AnnualFuel_{old}$  =the estimated annual fuel of the existing, older locomotive (gallons of diesel)

$Fuel\ Savings\ \%$  =fuel savings percent (%) using manufacturer data for the new fuel-efficient engine

For example, based on manufacturer’s testing the new fuel-efficient Tier 4 engines will result in an overall fuel savings of 8 percent (8% = 0.08).

$$AnnualFuel_{new} = 50,000 \frac{Diesel\ gallons}{Year} * (1 - 0.08) = 46,000 \frac{Diesel\ gallons}{Year}$$

**2. For calculating air pollution emission estimates, the quantification methodology assumes that a Tier 2 locomotive will be operated for New/Expanded Service projects and that a Tier 4 locomotive will replace Tier 2 locomotive for Cleaner Vehicles/Technology/Fuels projects. What if I am operating a cleaner Tier locomotive for a New/Expanded Service project or replacing an older Tier locomotive for a Cleaner Vehicles/Technology/Fuels project?**

This year the TIRCP Quantification Methodology includes a new co-benefit summary tab to enable the California State Transportation Agency the ability to report on key variables and air pollutant emission estimates from TIRCP investments. In order to calculate the air pollutant emission estimates and not require additional inputs from applicants, assumptions were made about what Tier locomotive would be used or replaced for the different project types. Although these assumptions may not exactly match the Tier locomotives used or replaced in a project, the calculated air pollution emission estimates result in a conservative estimate. These calculated air pollutant emission estimates are not a part of the TIRCP selection criteria.

Per the 2018 TIRCP Guidelines, agencies may submit additional calculations or information in the application to demonstrate benefits that may not be captured in the TIRCP Calculator Tool. Agencies are encouraged to submit supplemental information that demonstrate the benefits of operating a cleaner Tier locomotive or replacing an older locomotive as part of the TIRCP application.

CARB staff periodically review each quantification methodology to evaluate its effectiveness and update methodologies to make them more robust, user-friendly, and appropriate to the projects being quantified.