

double counted in any other Air District grant program, either at the present time or for future vehicles that will use the facility during its years effectiveness.

The total mileage a vehicle can travel may be limited by regulation, and the product of Years of Effectiveness and Average Annual Miles cannot exceed that mileage (e.g., some cities limit the lifetime miles a taxicab can travel).

Heavy-duty vehicle and infrastructure projects: The California Air Resources Board (CARB) [Carl Moyer Program Guidelines](#) document is the source for the formulas and factors used in the Heavy-Duty Vehicle worksheet. Note that there are some differences between the TFCA and Moyer programs; consult Air District staff with any questions. At a minimum, a funded vehicle must have an engine complying with the model year 2010 and later emission standards. Vehicles that are funded by the TFCA shall not be co-funded with other funding sources that claim emissions credits.

Documentation and Recordkeeping

Beginning in FYE 2012, Project files must be maintained by County Program Managers and Grantees for a minimum of *five years* following completion of the Project Years Effectiveness, versus three years as before. Project files must contain all related documentation including copies of CARB executive orders, quotes, mileage logs, fuel usage (if cost-effectiveness is based on fuel use), photographs of engines and frames that were required to be scrapped, and financial records, in order to document the funding of eligible and cost-effective projects.

Guidance on inputs for the worksheets are as follows:

Instructions Tab

Provides instructions applicable to the relevant project type(s).

General Information Tab

Project Number, which has three parts:

1st – fiscal year in which project will be funded (e.g., 22 for FYE 2022).

2nd – County Program Manager; use the following abbreviations:

ALA – Alameda	CC – Contra Costa	MAR – Marin
NAP – Napa	SF – San Francisco	SM – San Mateo
SC – Santa Clara	SOL – Solano	SON – Sonoma

3rd – two-digit number identifying project; 00 is reserved for County Program Manager administrative costs.

Example: 22MAR04 = fiscal year ending **2022**, **Marin**, Project **#04**.

Project Title: *Short and descriptive* title of project, matching that on the Project Information Form.

Project Type Code: Insert **one and only one** of the following codes for the corresponding project type. If a project has multiple parts, use the code for the main component. Note that not all listed project types may be allowed in the current funding cycle.

Code	Project Type	Code	Project Type
0	Administrative costs	6c	Shuttle services – NG powered
1a	NG buses (transit or shuttle buses)	6d	Shuttle services – EV powered
1b	EV buses	6e	Shuttle services – Fuel cell powered

Code	Project Type	Code	Project Type
1c	Hybrid buses	6f	Shuttle services – Hybrid vehicle
1d	Fuel cell buses	6g	Shuttle services – Other fuel type
1e	Buses – Alternative fuel	6h	Shuttle services w/TFCA purchased retrofit
2a	NG school buses	6i	Shuttle services – fleet uses various fuel types
2b	EV school buses	7a	Class 1 bicycle paths
2c	Hybrid school buses	7b	Class 2 bicycle lanes
2d	Fuel cell school buses	7c	Class 3 bicycle routes, bicycle boulevards
2e	School buses – Alternative fuel	7d	Bicycle lockers and cages
3a	Other heavy-duty – NG (street sweepers, garbage trucks)	7e	Bicycle racks
3b	Other heavy-duty – EV	7f	Bicycle racks on buses
3c	Other heavy-duty – Hybrid	7g	Attended bicycle parking (“bike station”)
3d	Other heavy-duty – Fuel cell	7h	Other type of bicycle project (e.g., bicycle loop detectors)
3e	Other heavy-duty - Alternative fuel (High Mileage)	7i	Bike share
3f	Other heavy-duty - Alternative fuel (Low Mileage)	7j	Class 4 cycle tracks or separated bikeways
4a	Light-duty vehicles – NG	8a	Signal timing (Regular projects to speed traffic)
4b	Light-duty vehicles – EV	8b	Arterial Management – transit vehicle priority
4c	Light-duty vehicles – Hybrid	8c	Bus Stop Relocation
4d	Light-duty vehicles – Fuel cell	8d	Traffic roundabout
4e	Light-duty vehicles – Other clean fuel	9a	Smart growth – traffic calming
5a	Implement TROs (pre-1996 projects only)	9b	Smart growth – pedestrian improvements
5b	Regional Rideshare Program	9c	Smart growth – other types
5c	Incentive programs (for any alternative mode)	10a	Rail-bus integration
5d	Guaranteed Ride Home programs	10b	Transit information / marketing
5e	Ridesharing – Vanpools (if cash incentive only, use 5c)	11a	Telecommuting demonstration
5f	Ridesharing – School carpool match	11b	Congestion pricing demonstration
5g	Other ridesharing / trip reduction projects	11c	Other demonstration project
5h	Trip reduction bicycle projects (e.g., police on bikes)	12a	Natural gas infrastructure
6a	Shuttle services – diesel powered	12b	Electric vehicle infrastructure
6b	Shuttle services – gasoline powered	12c	Alternative fuel infrastructure

- County:** Use the same abbreviations as used in Project Number.
- Worksheet Calculated by:** Name of person completing the worksheet.
- Date of Submission:** Date submitted to the County Program Manager.
- Project Sponsor Organization:** Organization responsible for the project.
- Contact Name:** Name of individual responsible for implementing the project. Include all contact information requested (email, phone, address).
- Project Start Date:** Date work begins on a project. Note: Project must meet Readiness Policy (Policy #6).

- Project Completion Date:** Date the project was completed.
- Final Report to CMA:** Date the Final Report was received by the County Program Manager.
Note: County Program Managers must expend funds within two years of receipt, unless an application states that the project will take a longer period of time and is approved by the County Program Manager or the Air District.

Calculations Tab

Because the worksheets have many interrelated formulas and references, users must not add or delete rows or columns, or change any formulas, without consulting with the Air District. Several cells have input choices or information built in, as pull-down menus or comments in Excel. Pull-down menus are accessed by clicking on the cell. Comments are indicated by a small triangle in the upper right corner of a cell, and are made visible by resting the cursor over the cell.

Cost-Effectiveness Inputs

- # Years Effectiveness:** Equivalent to the administrative period of the grant. See inputs table below. The best practice is to use shortest value possible.
- Total Project Cost:** Total cost of project including TFCA funding, sponsor funding, and funds contributed by other entities. Only include goods and services of which TFCA funding is an integral part.
- TFCA Cost:** TFCA 40% County Program Manager Funds and the 60% Regional Funds (if any), listed separately.

Emission Reduction Calculations

Instructions and default values for each project type are provided in the table below. Default values for years of effectiveness are provided for the various project types. There are no defaults for Smart Growth projects, due to the wide variability in these projects.

Notes & Assumptions Tab

Provide an explanation of all assumptions used. If you choose to use assumptions or values different from those default values provided in the Air District’s guidelines, **submit documentation and an explanation** about your inputs and assumptions to request approval from the Air District prior to awarding funds to the project.

Emission Factors Tab

This tab contains references for the Calculations tab. **No changes shall be made to this tab.**

Additional Information for Heavy-duty Vehicle Projects

CARB has adopted a number of standards and fleet rules that limit funding opportunities for on-road heavy-duty vehicles. See the below list of CARB rules that affect on-road heavy-duty fleets, followed by a reference sample CARB Executive Order. For assistance in determining whether a potential project is affected, contact Air District staff or consult Carl Moyer Implementation Charts at:

<http://www.arb.ca.gov/msprog/moyer/guidelines/supplemental-docs.htm>

Summary of On-Road Heavy-Duty Fleet Rules

Vehicle Type	Subject to CARB Fleet Rule?
Urban buses	Fleet Rule for Transit Agencies
Transit Fleet Vehicles	Fleet Rule for Transit Agencies
Solid Waste Collection Vehicles, excluding transfer trucks	Solid Waste Collection Vehicle Regulation
Municipal Vehicles and Utility Vehicles	Fleet Rule for Public Agencies and Utilities
Port and Drayage Trucks	Port Truck Regulation
All other On-road heavy-duty vehicles	On-road Rule

Summary of Maximum Cost-Effectiveness & Years Effectiveness by Project Category

Policy No.	Project Category	Maximum C-E (\$/weighted ton)	Years Effectiveness
22	Alternative Fuel Light- and Medium-Duty Vehicles	500,000	3 years recommended, 4 years max
23	Reserved	Reserved	Reserved
24	Alternative Fuel Heavy-Duty Trucks and Buses	500,000	3 years recommended, 4 years max
25	On-Road Truck Replacements	90,000	3 years recommended, 4 years max
26	Alternative Fuel Infrastructure	500,000	3 years recommended, 4 years max
27	Ridesharing Projects – Existing	150,000	2 years max
28	Shuttle/Feeder Bus Service – Existing	200,000; 250,000 for services in CARE Areas or PDAs	2 years max
29.a.	Shuttle/Feeder Bus Service – Pilot not in CARE Areas or PDAs. <i>These projects will be evaluated every year.</i>	Year 1 - 500,000 Year 2 and beyond - see Policy #28 shuttle is considered existing	2 years max
	Shuttle/Feeder Bus Service – Pilot shuttle projects located in Highly Impacted Communities as defined in the Air District CARE Program and/or a Planned or Potential PDA may receive TFCA Funds under the Pilot designation. <i>These projects will be evaluated every year.</i>	Years 1 & 2 - 500,000 Year 3 and beyond - see Policy #28 shuttle is considered existing	2 years max
29.b.	Pilot Trip Reduction	500,000	2 years max
30.a.	Bicycle Parking	250,000	3 years max
30.b.	Bikeways	500,000	10 years max
31	Bike Share	500,000	5 years max
32	Arterial Management	250,000	2 years, or 4 years with retiming at 2 years
33	Infrastructure Improvements for Trip Reduction	250,000	10 years max
34	Telecommuting	150,000	2 years max

Emission Reduction Inputs

County Program Managers must describe all relevant assumptions used to determine the project’s cost-effectiveness in the Notes & Assumptions tab. If a CPM seeks to use different default values or methodologies, it is advised that the CPM consult with Air District staff, before project approval, to avoid the risk of funding projects that are not eligible for TFCA funds.

Project Type/Worksheet Name	Input Data Needed	Default Assumptions
<p>Trip Reduction (Existing and Pilot) Worksheet = Trip Reduction FYE 2022</p> <p><i>For Pilot Trip Reduction projects, follow the instructions of the most similar project type. Any deviations from the default assumptions used must be supported by documentation or data.</i></p> <p>Project Type = 5a-h, 8b, 9a-c, 11a-c</p>		
<p>Ridesharing</p>	<p># Years Effectiveness</p> <p># Trips/Day (1-way) eliminated [% of target population (# employees)]</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p> <p># New Trips/Day (1-way) to access transit</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p> <p><i>For ridesharing, the default maximum number of vehicle trips reduced per day is 1% of target population.</i></p>	<p>Enter in Cost Effectiveness Inputs, up to 2 years</p> <p>Enter in Step 1-Column A, 1% of target population</p> <p>Enter in Step 1-Column B, 240 days (max.)</p> <p>Step 1-Column C, Default = 16 miles (1-way commute distance from MTC’s Commute Profile)</p> <p>Step 2-Column A, Default = 50% of # Trips/Day Eliminated (Step 1-Column A)</p> <p>Enter in Step 2-Column B, same # as Step 1-Column B</p> <p>Enter in Step 2-Column C, Default = 3 miles</p>
<p>School-Based Ridesharing</p>	<p># Years Effectiveness</p> <p># Trips/Day (1-way) eliminated [% of target population (total # students)]</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p> <p><i>For ridesharing, the default maximum number of vehicle trips reduced per day is 1% of target population.</i></p>	<p>Enter in Cost Effectiveness Inputs, up to 2 yrs</p> <p>Step 1-Column A, No Default</p> <p>Enter in Step 1-Column B, 180 days (max.)</p> <p>Step 1-Column C, 1-3 miles</p>
<p>Transit Incentive Campaigns</p>	<p># Years Effectiveness</p> <p># Trips/Day (1-way) eliminated [% of target population]. Use survey data if available.</p> <p>Days/Yr</p>	<p>Enter in Cost Effectiveness Inputs, up to 2 yrs</p> <p>Step 1-Column A, No default</p> <p>Enter in Step 1-Column B, 90 days (max.) if # Trips/Day based on % of target population. If # Trips/Day based on participants, 240 days (max).</p>

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	Trip Length (1-way), based on routes accessed	Step 1-Column C, No Default
	# New Trips/Day (1-way) to access transit	Step 2-Column A, 50% of # Trips/Day Eliminated (Step 1-Column A)
	Days/Yr (new trips)	Enter in Step 2-Column B - same as # days used in Step 1
	Trip Length (1-way) for new trips	Step 2-Column C, Default = 3 miles
<u>Guaranteed Ride Home Programs</u>	# Years Effectiveness	Enter in Cost Effectiveness Inputs, up to 2 years
	# Trips/Day (1-way) eliminated	Enter in Step 1-Column A, 0.2% of target population.
	Days/Yr	Enter in Step 1-Column B, 240 days (Max.)
	Trip Length (1-way)	Step 1-Column C, Default = 16 miles
<u>Transit Vehicle Signal Prioritization</u>	# Years Effectiveness	Enter in Cost Effectiveness Inputs, 2 yrs
	# Trips/Day (1-way) eliminated	Step 1-Column A, No Default
	Days/Yr	Enter in Step 1-Column B, 240 days (max)
	Trip Length (1-way)	Step 1-Column C, No Default Step 2-Column A, 50% of # Trips/Day Eliminated (Step 1-Column A) Step 2-Column B, same as Step 1-Column B Enter in Step 2-Column C, 3 miles
<u>Infrastructure Improvements for Trip Reduction</u>	# Years Effectiveness	Enter in Cost Effectiveness Inputs, 10 years max
	Note: Default assumption available for Years of Effectiveness only. Provide detailed explanations (in Notes and Assumptions tab) of assumptions used for other inputs.	
Project Type =6a-i, 10a-b		
<u>Shuttle/Feeder Bus, Rail-Bus Integration, and Transit Information Systems</u>	# Years Effectiveness	Cost Effectiveness Inputs, up to 2 years
	# Trips/Day (1-way) eliminated trips. Trips only from riders who previously would have driven.	Step 1-Column A For on-going service, use survey results

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	Days/Yr eliminated trips	Step 1-Column B, Enter number of operating days. Default =240 days/yr.
		Enter in Step 1-Column C, a survey-based distance, or, if no survey, 16 miles for shuttles and 35 miles for vanpools
	# Trips/Day (1-way) new trips to access transit	Step 2-Column A, Use survey data or, if none, a default is 50% of # Trips/Day Eliminated (Step 1-Column A)
	Trip Length (1-way) new trips. Average trip length of shuttle passengers that drive from home to the BART/Caltrain station.	Enter in Step 2-Column C, a survey-based distance, or, if no survey, default is 3 miles for home-to-rail trips.
	<i>When possible, emissions from shuttle vehicles should be based on the vehicle engine Executive Order. County Program Manager should consult with Air District staff for guidance.</i>	
	Follow Step 3A for vans and shuttle vehicles 14,000 lbs. and lighter. Follow Step 3B for buses	
	# Vehicles, Model Year: Number of vehicles with same model year	Step 3A - Column A, no default.
	Emission Std.: Emission Standard from list provided.	3A - Column B, no default.
	Vehicle GVW: Weight Class from list provided.	3A Column C, no default.
	ROG, NO_x, Exhaust PM₁₀, and Total PM₁₀ Factors: enter factor from appropriate table provided on Emission Factors tab—CARB Table 2 for vehicles model year 2004 and after, or CARB Table 7 for model years 1995-2003.	3A Column D through G, no default
	CO₂ Factor: enter factor from CO ₂ Table for Light- and Light Heavy-Duty Shuttles, on Emission Factors tab.	3A Column H, no default.
	Total annual VMT = [length of shuttle/van trip (one-way)] X [# one-way trips per day] X [# days of service per year]. For all vehicles listed in Step 3A.	3A Column I, no default.

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	<p><i>If a vehicle does not match the factors provided, County Program Manager should consult with Air District staff.</i></p>	
	<p>ROG, NO_x, Exhaust PM₁₀, Other PM₁₀ and CO₂ Factors: enter factor from Emissions for Buses Table provided on Emission Factors tab.</p>	<p>Step 3B: Columns D through H, no default. Note that Step 3B uses Other PM₁₀, not Total PM₁₀.</p>
	<p>Total annual VMT = [length of shuttle/van trip (one-way)] X [# one-way trips per day] X [# days of service per year]. For all vehicles listed in Step 3B.</p>	<p>3B Column I, no default.</p>
<p>Project Type = 7a-j, 11a</p>		
<p><u>Bikeways (Paths, Lanes, Routes)</u></p> <p>Notes:</p> <ul style="list-style-type: none"> • For Class 1 projects, use the ADT on the most appropriate parallel road. • For gap closure projects (where project will close a gap between two existing segments of bikeway), use the length for the total facility. • The maximum number of vehicle trips reduced per day is 240. The Air District generally assumes that no bike project will reduce more than 240 vehicle trips per day. 	<p><i>Methodology to estimate number of trips reduced for bike paths, lanes, & routes is based on:</i></p> <ul style="list-style-type: none"> • Facility type (Class 1, 2, 3, or 4) • Length of the project segment • Traffic volume (ADT) on the facility 	
	<p># Years Effectiveness</p> <p>Class 1 bike path (or bike bridge) Class 2 bike lane Class 3 bike route Class 4 cycle tracks or separated bikeways</p>	<p>Enter in Cost Effectiveness Inputs:</p> <p>Not to exceed 10 years for Class 1 (trails/paths) Not to exceed 7 years for Class 2, Class 3 and Class 4</p>
	<p># Trips/Day (1-way) eliminated (depends on length of project segment and ADT on project segment)</p> <p>Class 1 & Class 2 & Class 4 ADT ≤ 12,000 vehicles per day</p> <p>Class 1 & Class 2 & Class 4 ADT > 12,000 and ≤ 24,000</p> <p>Class 1 & Class 2 & Class 4 ADT > 24,000 and ≤ 30,000 <i>Maximum is 30,000.</i></p>	<p>Enter in Step 1-Column A:</p> <p>Length ≤ 1 mile = 0.4% ADT Length >1 and ≤ 2 miles = 0.6% ADT Length >2 miles = 0.8% ADT</p> <p>Length ≤ 1 mile = 0.3% ADT Length > 1 and ≤ 2 miles = 0.45% ADT Length > 2 miles = 0.6% ADT</p> <p>Length ≤ 1 mile = 0.25% ADT Length > 1 and ≤ 2 miles = 0.35% ADT Length > 2 miles = 0.45% ADT</p>

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	<p>Class 3 bike route or bicycle blvd</p> <p>Upgraded Class 1 & Upgraded Class 4</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p>	<p>Route ≤ 1 mile = 0.1% ADT</p> <p>Route > 1 and ≤ 2 miles = 0.15% ADT</p> <p>Route > 2 miles = 0.25% ADT</p> <p>Use 10% of the appropriate formula above</p> <p>Enter in Step 1-Column B, 240 days</p> <p>Enter in Step 1-Column C, 3 miles. (Not same as segment length.)</p>
Bicycle Parking	<p># Years Effectiveness</p> <p># Trips/Day (1-way) eliminated</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p>	<p>Enter in Cost Effectiveness Inputs, 3 yrs</p> <p>Enter in Step 1-Column A:</p> <p>Capacity of lockers x 2 trip/day</p> <p>Capacity of cages x 0.75 trips per day</p> <p>Capacity of racks x 0.5 trips per day</p> <p>Enter in Step 1-Column B, 240 days</p> <p>Enter in Step 1-Column C, 3 miles</p>
Bike Share	<p># Years Effectiveness</p> <p># Trips/Day (1-way) eliminated</p> <p>Weekdays</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p> <p>Weekends</p> <p>Days/Yr</p> <p>Trip Length (1-way)</p>	<p>Enter in Cost Effectiveness Inputs, max. 5 yrs</p> <p>Enter in Step 1-Column A:</p> <p>Number of bikes * 1.48 trips per day * 12% (actual vehicle trips replaced based on Shaheen research dated June 2015)</p> <p>Enter in Step 1-Column B, 260 days</p> <p>Enter in Step 1-Column C, 16 miles</p> <p>Enter in Step 1-Column B, 105 days</p> <p>Enter in Step 1-Column C, 3 miles</p>
<p>Telecommuting</p> <p>Note: Default assumption available for Years of Effectiveness only. Provide detailed explanations (in Notes and Assumptions tab) of assumptions used for other inputs.</p>	<p># Years Effectiveness</p>	<p>Cost Effectiveness Inputs, up to 2 years</p>
<p>Arterial Management</p> <p>Worksheet = Arterial Management FYE 2022</p>		

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Project Type = 8a-d		
<p>Arterial Management (Signal Timing)</p> <p>Note: Data for traffic volume and vehicle speed must be generated concurrently (i.e., during the exact same day and time period)</p>	# Years Effectiveness	Enter in Cost Effectiveness Inputs: For signal timing/synchronization, 2 yrs or, with retiming required at 2 yrs, 4 yrs. Each project should include either 2- or 4-year segments, not both.
	Name of Arterial	Column A: Name of the arterial and the direction of travel.
	Segment Length (miles)	Enter under Column B the length of arterial over which speeds will be increased.
	Days/Yr	Enter under Column C the number of days per year over which the project would affect traffic. Default is 240 days.
	Time Period	Enter under Column D the time period over which the traffic volumes and speed will change (e.g., 4-7 PM). Include all the hours in a period that will benefit, not just the peak hour.
	Traffic Volume	Enter under Column E the traffic volume before the project for the corresponding Time Period and direction of travel that will make the stated speed change.
	Traffic Speed without the Project	Enter under Column F the average traffic speed along the length of the arterial before implementation of the project.
	Travel Speed with Project	Enter under Column G the average estimated traffic speed along the length of the arterial after implementation of the project. <i>Note: Maximum increase in speed is 25%.</i>
<p>Alternative Fuel Heavy-Duty Vehicles and Infrastructure</p> <p>Worksheets = Heavy-Duty Vehicle FYE 2022</p>		
Project Types = 1a-e, 2a-e, 3a-f, 12a-c		
<p>Alternative Fuel Heavy-Duty Vehicles and Infrastructure</p> <p><i>Use separate workbook and Project # for each set of vehicles with different # Years Effectiveness or with different fuel types.</i></p>	# Years Effectiveness.	Cost Effectiveness Inputs, 3 years is recommended - not to exceed 4 years.
	Column B, Unit #: A unique identifier. List each vehicle on a separate row.	Column B: No default
	Columns C through E, Baseline Emission Rate: NO _x , ROG, PM factors: See Moyer Table D-2a/b or D-6, based on your vehicle type, weight, and engine model year.	Columns C through E: For FYE 2019 alt-fuel heavy-duty vehicle projects, including urban buses, the baseline default is the Model Year 2010 emission standards.
	Column F, Annual Fuel Use: Base on average fuel use over 2 years, and document with 2 years of records.	Column F: No default.
	Column G, Fuel Consumption Factor: Moyer Table D-24	Column G: Most on-road engines are below 750 horsepower, thus the default value is 18.5.

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	<p>Column H, Conversion Factor (g/mi</p>	
	<p>Column I, Annual VMT: Base on average VMT over 2 years, and document with 2 years of mileage records.</p>	<p>Column I: No default.</p>
	<p>hr to g/mi): Input a value only if</p>	<p>Column J: No default.</p>
	<p>Column K, Percent operation in Air District: Only the operation within the Air District’s jurisdiction can be counted.</p>	<p>Column K: No default.</p>
	<p>Columns L through N, New Emission Rate: NO_x, ROG, and PM: Use Executive Order values.</p> <p><i>Note: FEL engines are not eligible for TFCA funding.</i></p> <p><i>CARB certifies engines and provides the engine manufacturers with an Executive Order (EO) for each certified engine family. An example of an EO is shown at the end of this attachment. The EO includes general information about the certified engine such as engine family, displacement, horsepower rating(s), intended service class, and emission control systems. It also shows the applicable certification emission standards as well as the average emission levels measured during the actual certification test procedure. For the purpose of the TFCA Program, the certification emission standards are used to calculate emission reductions. The certification emission standards are shown in the row titled “(DIRECT) STD” under the respective “FTP” column headings for each pollutant. For instance, the Cummins 8.3 liter natural gas engine illustrated in the sample was certified to a combined oxides of nitrogen plus non-methane hydrocarbon (NO_x+NMHC) emission standard of 1.8 g/bhp-hr, a carbon monoxide (CO) emission standard of 15.5 g/bhp-hr, and a particulate matter (PM) emission standard of 0.03 g/bhp-hr.</i></p> <p><i>In the case where an EO shows emission values in the rows labeled “AVERAGE STD” and/or “FEL”, the engine is certified for participation in an averaging, banking, and trading (AB&T) program. AB&T engines (i.e., all FEL-certified engines) are not eligible to participate in the TFCA Program for new vehicle purchase projects since emission benefits from an engine certified to an FEL level are not surplus emissions.</i></p>	<p>Columns L through N: For FYE 2018 heavy-duty vehicle projects, including urban buses, the new vehicle must be certified to <i>exceed</i> the Model Year 2010 standard of 0.2 g/bhp-hr of NO_x and 0.01 g/bhp-hr of PM, which are the default values. Some exceptions apply.</p>

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	<p>Column O, Replacement Vehicle Cost: Must be supported by a quote for the new alt-fuel vehicle that exceeds standards.</p>	<p>Column O: No Default.</p>
		<p>Column P: No Default.</p>
	<p>Column Q, Fuel Savings.</p>	<p>Column Q: Default value is 0%. For new hybrid vehicles, on a case-by-case basis, the Air District may approve another value, based on documented fuel savings relative to a non-hybrid vehicle.</p>
	<p>Column R, Fuel Consumption Factor: Use Moyer Table D-24.</p>	<p>Column R: Most on-road engines are below 750 horsepower.</p>
	<p>Column S, Conversion Factor (g/mi to g/bhp-hr): Enter a value only if New Emission Rates (Columns L – N) are in g/mi and Fuel Basis is being used. Notice: enter data in this column or Column T, not both. Use Moyer Table D-28.</p>	<p>Column S: No default.</p>
	<p>Column T, Conversion Factor (g/bhp-</p>	<p>Column T: No default.</p>
	<p>Column Y, # Years Effectiveness: Same as in Cost Effectiveness Inputs.</p>	<p>Column Y: 3 years is recommended - 4 yrs max.</p>
	<p>Columns AB – AG, Emission Reductions.</p>	<p>Columns AB – AG. Calculated automatically. Enter zero (0) if a reduction cannot be claimed.</p>
	<p>Column AM, TFCA Funding Amount: Amount of total TFCA funding. The column total must equal Total TFCA Cost from Cost-Effectiveness Inputs at top of worksheet.</p>	<p><i>All reductions must be surplus to any regulatory, contractual, or other legally binding requirement.</i></p> <p><i>Note that if ROG values are not available for both the baseline and the proposed engine, ensure value is zero (0) for ROG, as no ROG emission reductions can be claimed.</i></p>


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	<p>Column AP, Actual Weighted CE w/o CRF--Miles Basis (\$/ton). Cost-effectiveness based on emissions including weighted PM. Must meet Policy Requirements.</p>	<p>Column AP: Calculated automatically.</p>
	<p>Column AQ, Actual Weighted Contract CE w/o CRF--Fuel Basis (\$/ton). Cost-effectiveness based on emissions including weighted PM. Must meet Policy Requirements.</p>	<p>Column AQ: Calculated automatically.</p>
<p><i>Emissions and cost-effectiveness calculations can only be based on fuel usage for the following vehicles:</i></p> <ul style="list-style-type: none"> • Utility vehicles in idling service • Street sweepers • Solid waste collection vehicles <p><i>All other vehicles must use mileage basis. If using fuel-based calculations, usage must be based on two years of historical fuel usage documentation (e.g., fuel logs or purchase receipts.)</i></p>		
	<p>Column AS, Baseline CO₂ Factor Based on Mileage: Enter value from CO₂ Emission Factors Table for your fuel and vehicle type (e.g., Medium Heavy Duty Diesel is 1527 g/mi).</p>	<p>Column AS: No default.</p>
	<p>Column AT, Proposed Engine CO₂ Factor Based on Mileage: Enter value from CO₂ Emission Factors Table for your fuel and vehicle type (e.g., Medium Heavy Duty CNG 1098 g/mi).</p>	<p>Column AT: No default.</p>
	<p>Column AV, Baseline CO₂ Factor Based on Fuel Use: Enter value from CO₂ Emission Factors Table for your fuel type (e.g., Diesel is 10079 g/mi).</p>	<p>Column AV: 10079 g/mi.</p>
	<p>Column AW, Proposed Engine CO₂ Factor Based on Fuel Use: Enter value from CO₂ Emission Factors Table for your fuel type (e.g., CNG is 7244 g/mi).</p>	<p>Column AW: No default.</p>
<p>Alternative Fuel Vehicles and Infrastructure</p>		
<p>Worksheets = LD & LHD Vehicle FYE 2022, EV Infrastructure FYE 2022</p>		
<p>Project Types = 4a-e, 12a-c, including projects that replace heavy-duty vehicles with and buses with alternative fuel light-duty vehicles</p>		
<p><u>Vehicles</u></p>		

County Program Manager Fund Expenditure Plan Guidance FYE 2022

Alternative Fuel Vehicles and Infrastructure (Light- and Medium-Duty)	# Years Effectiveness	3 years is recommended - 4 years max.
	Unit # / ID	List each vehicle separately.
	Current Standard and New Vehicle Standard	Enter in Columns E and F the standard that a vehicle is certified to, as shown on the CARB Executive Order.
	Cost-Effectiveness	Column U, automatically calculated. Each vehicle must meet the Policy requirements for cost-effectiveness.
	Infrastructure	
	# Years Effectiveness	
	Charger ID	List each charger separately
	Description	Enter description
	Type	Select type from dropdown menu, types are defined in Notes and Assumptions tab
	Qty	Enter quantity of charging stations
TFCA Funding	Enter total amount of TFCA funding requested for all charging stations	
Annual Usage (kWh)	$(\text{Rate kW}) \times (\text{charger's estimated hours of usage per day}) \times (365 \text{ days per year}) \times (\text{quantity of chargers})$	

Sample CARB Executive Order for Heavy-Duty On-Road Engines

	CUMMINS INC.	EXECUTIVE ORDER A-021-0571-1 New On-Road Heavy-Duty Engines Page 1 of 2 Pages
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Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³	DIAGNOSTIC ⁶
2012	CCEXH0729XAD	11.9	Diesel	Diesel	UB	DDI, TC, CAC, ECM, EGR, OC, SCR-U, PTOX	EMD
PRIMARY ENGINE'S IDLE EMISSIONS CONTROL ⁵		ADDITIONAL IDLE EMISSIONS CONTROL ⁵					
Exempt		N/A					
ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)						
11.9	ISX11.9 385 / 3865;FR20350 (379), ISX12 385 / 3865;FR20350 (379)						

¹ =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc; l=liter; hp=horsepower; kw=kilowatt; hr=hour;
² CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
³ L/MH HDD=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;
⁴ ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; NAC=NOx adsorption catalyst; SCR-U / SCR-N=selective catalytic reduction - urea / - ammonia; WU (prefix) =warm-up catalyst; DPF=diesel particulate filter; PTOX=periodic trap oxidizer; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SF/MPFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; ID/IDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR / EGR-C=exhaust gas recirculation / cooled EGR; PAIR/AIR=pulse/secondary air injection; SPL=splume puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; AMOX=ammonia oxidation catalyst
⁵ ESS=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1), 30g/30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C)); APS =internal combustion auxiliary power system; ALT=alternative method (per 13 CCR 1956.8(a)(6)(D)); Exempt=exempted per 13 CCR 1956.8(a)(6)(B) or for CNG/LNG fuel systems; N/A=not applicable (e.g., Otto engines and vehicles);
⁶ EMD=engine manufacturer diagnostic system (13 CCR 1971.1); OBD=on-board diagnostic system (13 CCR 1971.1);

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.)

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	0.14	0.14	0.20	0.20	*	*	15.5	15.5	0.01	0.01	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	0.04	0.01	0.12	0.09	*	*	1.1	0.00	0.004	0.002	*	*
NTE	0.21		0.30		*		19.4		0.02		*	

⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle, including RMCSET=ram mode cycle supplemental emissions testing; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methanehydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde; (Rev.: 2007-02-28)

BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971 (engine manufacturer diagnostic) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

This Executive Order hereby supersedes Executive Order A-021-057 dated December 7, 2011.

Executed at El Monte, California on this 17 day of April 2012.


Annette Hebert, Chief
Mobile Source Operations Division