

California Air Resources Board

User Guide

**California Air Resources Board
Funding Agricultural Replacement Measures for
Emission Reductions Program**

California Climate Investments



**FINAL
October 3, 2023**

Disclaimer:

- This tool is designed to calculate emission reductions, cost-effectiveness, and maximum grant amounts. While every effort has been exhausted and made to ensure that the calculations are accurate and consistent with applicable program guidelines, determining final project eligibility and verifying outputs generated by the tool is the responsibility of district staff.

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List of Acronyms and Abbreviations

Acronym	Term
bhp	brake horsepower
CARB	California Air Resources Board
CCI	California Climate Investments
DGE	diesel gallon equivalent
Diesel PM	diesel particulate matter
EER	energy efficiency ratio
FARMER	Funding Agricultural Replacement Measures for Emissions Reductions
g	gram
gal	gallon
GGRF	Greenhouse Gas Reduction Fund
GHG	greenhouse gas
HHD	heavy-heavy duty trucks
hp	horsepower
kWh	kilowatt-hour
lbs	pounds
MHD	medium-heavy duty trucks
mi	mile
MJ	megajoule
MTCO _{2e}	metric tons of carbon dioxide equivalent
NO _x	oxides of nitrogen
PM	particulate matter
PM _{2.5}	particulate matter with a diameter less than 2.5 micrometers
PM ₁₀	particulate matter with a diameter less than 10 micrometers
ROG	reactive organic gas
scf	standard cubic foot
UTV	utility terrain vehicles
VMT	vehicle miles traveled
yr	year

List of Definitions

Term	Definition
Activity	Annual operation of the equipment, measured in annual average hours of use.
Baseline Equipment	Engine technology applied under normal business practices, such as the existing engine in a vehicle or equipment for replacements, repowers, and retrofits. In other words, the equipment that is currently owned/in operation that will be repowered, retrofitted, or scrapped and replaced with a newer, cleaner piece of equipment.
Co-benefit	A social, economic, or environmental benefit as a result of the proposed project in addition to the GHG reduction benefit.
Cost-effectiveness	A measure of the dollars provided to a project for each ton of covered emission reduction.
Cost-effectiveness Limit	The maximum amount of funds the Moyer Program will pay per weighted ton of emission reductions.
Deterioration	The increased exhaust emissions over time taking into account wear and tear on engines and emissions control devices.
Deterioration Life	A factor calculated from the period of time the engine has deteriorated, plus half the project life, used to estimate deterioration over the entire project life.
Deterioration Product	The result of multiplying the deterioration rate, equipment activity, and the deterioration life for a technology.
Deterioration Rate	Rates that estimate increased air pollutant emissions from engine wear and tear and other variables that increase engine emissions over time. On-road deterioration rates are established by weight class and engine model year, based on values in CARB's on-road emission inventory model. Off-road deterioration rates are established by horsepower and either Tier or model year, based on values in CARB category-specific inventory models.
Energy and Fuel Cost Savings	Changes in energy and fuel costs to the farmer or agricultural operation as a result of the project. Savings may be achieved by changing the quantity of energy or fuel used, conversion to an

User Guide for the CARB FARMER Program

Term	Definition
	alternative energy or fuel source/vehicle, or renewable energy or fuel generation to displace existing fuel purchases.
Intended Service Class	The service weight class that the vehicle will be used for. This is often, but not always, the same as the Gross Vehicle Weight Rating.
Key Variable	Project characteristics that contribute to a project's GHG emission reductions and signal an additional benefit (e.g., fossil fuel use reductions).
Load Factor	Average operational level of an engine in a given application as a fraction or percentage of the engine manufacturer's maximum rated horsepower.
Project Type	For the purposes of the FARMER Quantification Methodology, eligible projects fall into six project types that meet the objectives program and for which there are methods to quantify GHG emission reductions.
Quantification Period	Number of years that the equipment will provide GHG emission reductions that can reasonably be achieved and assured. Sometimes referred to as "Project Life" or "Useful Life."
Replacement Equipment	The new, retrofitted, or reconditioned equipment(s) that replaces the use of the baseline equipment(s).
Repower	Replacement of the existing engine with an electric motor or a newer emission-certified engine instead of rebuilding the existing engine to its original specifications.
Retrofit	Modifications to the engine and fuel system so that the retrofitted engine does not have the same emissions specifications as the original engine, or the process of installing a CARB-verified emissions control system on an existing engine.

Section A. Introduction

The California Air Resources Board (CARB) Funding Agricultural Replacement Measures for Emissions Reductions (FARMER) program reduces greenhouse gas (GHG) emissions by replacing older, higher-emitting agricultural equipment/vehicles with newer, more efficient equipment/vehicles. For the FARMER Program, CARB staff developed the FARMER Benefits Calculator Tool and accompanying FARMER Quantification Methodology to provide guidance for estimating the GHG emission reductions and selected co-benefits of each proposed project type. This User Guide provides instructions for using the FARMER Benefits Calculator Tool (Section B) and presents some hypothetical example projects (Section C).

The FARMER Benefits Calculator Tool and supporting FARMER Quantification Methodology are available for download on the [California Climate Investments Resources webpage](#). Methods and equations used in the FARMER Benefits Calculator Tool for estimating GHG emission reductions and air pollutant emission co-benefits are provided in the FARMER Quantification Methodology.

Updates

CARB staff periodically review each quantification methodology and benefits calculator tool to evaluate their effectiveness and update methodologies to make them more robust, user-friendly, and appropriate to the projects being quantified. The current FARMER Benefits Calculator Tool was updated to include:

- Updating cost-effectiveness limits for Carl Moyer projects on contracted November 17, 2022 or later.
- Updating the GHG carbon intensity values to 2022 weighted averages.
- Updating the on-road fuel consumption factors to use data from EMFAC2021.
- Updating the fuel efficiency factors for off-road equipment to a 0.005 annual improvement from 1980-1986 and 0.0055 from 1987-2021, based on a [study by California Polytechnic State University, San Luis Obispo](#).
- Updating the fuel and energy costs to 2022 averages.
- Adding “electric” as a replacement fuel option for Moyer and FARMER on-road truck projects.
- Adding emission factors for LSI tractors less than 25 hp.
- Adding emission factors for baseline equipment with diesel engines less than 25 hp for the zero-emission agricultural equipment category.
- Adding “General Fund” as an available funding source.
- Extending reporting period date dropdown selection to Q4 2030.
- Extending engine model year dropdown selection to 2030 for replacements.
- Removed “FY 2020-2021” from the “FARMER allocation fiscal year” dropdown.
- Fixing cost-effectiveness calculations for two-step projects.
- Fixing calculation of awards and cost-effectiveness for irrigation pump projects

- with alternative fuel baseline engines.
- Revising the Air District Reporting Sheet to match FARMER's data compilation sheet.

Program Assistance

Applicants should use the following resources for additional questions and comments:

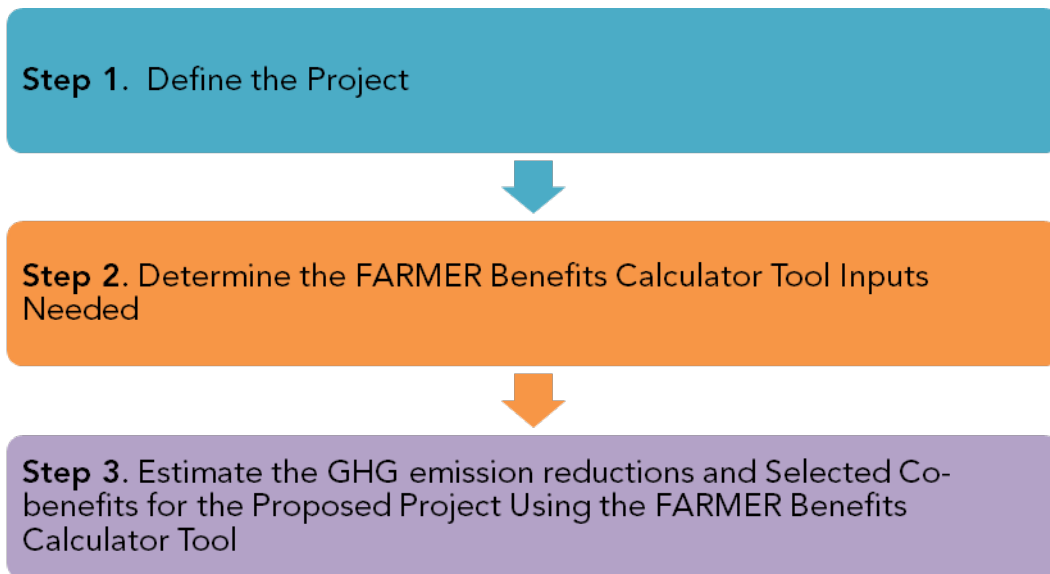
- Questions on this document should be sent to the [GGRF program email](#).
- For more information on CARB's efforts to support implementation of California Climate Investments, see the [Action Proceeds webpage](#).
- Questions pertaining to the FARMER program should be sent to the [FARMER program email](#).

Section B. Step-by-Step Guide

Overview

Applicants will follow the steps outlined in Figure 1 to estimate the GHG emission reductions and selected co-benefits from the proposed project. Detailed instructions for each step are provided on subsequent pages. Example projects showing how to estimate the GHG emission reductions and selected co-benefits from a given project are included in Section C.

Figure 1. Steps to Estimating GHG Emission Reductions and Selected Co-benefits



Step 1: Define the Project

CARB developed the following project types that meet the objectives of the [FARMER Program](#) and for which there are methods to quantify GHG emission reductions:

1. On-road heavy-duty truck replacement and repower projects
 - **Moyer On-Road Heavy-Duty Trucks:** Carl Moyer Program-eligible project category
 - **FARMER On-Road Heavy-Duty Trucks (new/used):** FARMER On-Road FARMER project category
2. Off-road equipment replacement and repower projects
 - **Off-Road Agricultural Equipment:** One-for-one transaction where a single baseline equipment is scrapped and a single new replacement equipment is procured
 - **Zero-Emission Off-Road Agricultural Equipment:** One-for-one transaction where a single baseline equipment is scrapped and a single zero-emission replacement equipment is procured
 - **Used Off-Road Agricultural Equipment:** One-for-one transaction where a single baseline equipment is scrapped and a single used replacement equipment is procured
 - **Off-Road Agricultural Equipment: 2 (or-more)-for-1:** In some cases, the replacement equipment is no longer available at similar horsepower ratings to the baseline equipment so the procurement of the higher horsepower equipment is allowed (additionally, multiple pieces of equipment may be scrapped to make the project more cost-effective,- also referred to as "2 (or more)-for-1")
3. Replacement and repower for agricultural pump engines
 - **Irrigation Pump Engines:** One-for-one transaction where a single baseline pump is scrapped and a single replacement pump is procured
 - **Irrigation Pump Engines: 2 (or-more)-for-1:** In some cases, the replacement pump is no longer available at similar horsepower ratings to the baseline equipment so the procurement of the higher horsepower pump is allowed (additionally, multiple pieces of equipment may be scrapped to make the project more cost-effective,- also referred to as "2 (or more)-for-1")
4. Zero-emission utility terrain vehicles
 - **ZEV_Ag_UTV:** Rebates for the purchase of zero-emission utility terrain vehicles (UTV)

5. Agricultural Trade-Up (Ag Trade-Up) Pilot
 - **Ag Trade-Up #1:** Transaction #1 - replacing off-road equipment with new off-road equipment
 - **Ag Trade-Up #2:** Transaction #2 - replacing off-road equipment with the old off-road equipment that was replaced in Transaction #1
6. Infrastructure
 - **Infrastructure (tied to project directly above):** Infrastructure that is meant to support a project from #1 - 4. Refer to the [Carl Moyer Guidelines](#) for guidance on eligible infrastructure.
7. Demonstration Category

For each single project, users must define it in the FARMER Benefits Calculator tool by identifying its applicable, eligible Project Type. Users can use the tool to estimate the GHG emission reductions and selected co-benefits for many projects spanning the myriad of eligible project types.

Moreover, when a project has associated infrastructure, users can select the “Infrastructure (tied to project directly above):” option. See the Example Projects section for an example of a project with infrastructure.

The option to select “Demonstration Category” in the FARMER Benefits Calculator tool as a project type is primarily for administrative purposes. Should an applicant and an air district seek to fund such a project, CARB will release a forthcoming quantification methodology along with a corresponding separate form. This form will collect parameters and inputs related to the methodology. These parameters and inputs are essential to the quantification of GHG reduction benefits and related co-benefits.

Step 2: Determine the FARMER Program Benefits Calculator Tool Inputs Needed

Table 1 identifies the required data inputs needed to estimate the GHG emission reductions and selected co-benefits for the proposed project with the FARMER Benefits Calculator Tool by project type. **Users should input data within the tool from Left-to-Right as well as Top-to-Bottom.**

Table 1. Required FARMER Benefits Calculator Tool General Information and Priority Population Benefits Inputs for Eligible Project Types (All Projects)

ALL PROJECTS
<p>General Information (Air District Info tab)</p> <ul style="list-style-type: none"> • Air District Name; • Contact Name; • Contact Phone Number; • Contact Email; • Date of Submission; • Report Covers Data Through; • Work expected to be completed by next progress report; • Any problems or issues encountered during quarter? (If so, please provide information on how this may impact the project(s)' outcome); and • If project(s) are behind the schedule of the grant agreement, please explain any reasons for delay and how the schedule will be resumed. <p>Basic Project Information and Information Regarding Priority Populations (Project Profile tab)</p> <ul style="list-style-type: none"> • Project Type; • District Supplied Project ID; • Number of baseline equipment/vehicle(s) being scrapped for 2 (or more)-for-1; • Project mailing address and latitude/longitude data; • Carl Moyer Guidelines Version (year); • Carl Moyer Mailout or Advisory Date (if applicable); • Project milestones; <ul style="list-style-type: none"> ○ Contract Execution Date ○ Post-Inspection Date ○ Date of Payment • Percent of Operation in District; • Percent of Operation in California; • Farm Size; • Would replacement have occurred without FARMER funding?;

ALL PROJECTS

- Questions regarding project benefits to a Priority Population (disadvantaged community, low-income community or household, or low-income community within 1/2-mile of a disadvantaged community) based on Assembly Bill 1550 (users can check if their project is located within a Priority Population using the map found on the [Community Investments webpage](#));
- Community needs met by the project (select from one of the Step 2 options on the [Sustainable Transportation Benefit Criteria Table](#)), if any;
- Written description of community needs that the project meets;
- Community benefits provided by the project (select from one of the Step 3 options on the [Sustainable Transportation Benefit Criteria Table](#)), if any;
- Written description of the benefits that the project provides; and
- Average Annual Use During Project Life (i.e., usage):
 - Numerical Value
 - Units
- Indicate Project Status
- Indicate Project Status: detailed description, etc.

In addition to quantitative project inputs that enable districts to determine incentive amounts, GHG emissions, and co-benefits, the FARMER Benefits Calculator Tool also collects information regarding project benefits to Priority Populations. Priority Populations are defined in CARB’s Funding Guidelines as disadvantaged communities, low-income communities, and/or low-income households. To provide information regarding benefits to Priority Populations, users only need to answer three questions and provide two written descriptions. They can fill out the answers for each project line item using the drop-down lists in the “Priority Population” columns as shown in Figure 2.

Figure 2: Screenshot of columns in the Quantification Inputs tab related to Priority Population benefits

Project Located Within:			Community Need Addressed	Written description of the identified community or household need	Benefit Criteria Met	Written description of the benefits to priority populations
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?				

1. Is the project located within a disadvantaged community, low-income community or household, or within a low-income community or low-income household that is within ½-mile of a disadvantaged community (Yes/No).
2. Does the project address a community need? Please refer to Step 2 of the [Sustainable Transportation Benefit Criteria Table](#) shown in Figure 3 to determine which criteria is most applicable to your project and select from the drop down list. Please also provide a written description of the identified community or household need.

Figure 3: Step 2 in the Sustainable Transportation Criteria Table per CARB’s 2018 Funding Guidelines

<p>Step 2: Address a Need. Identify an important community or household need of the priority population(s) identified in Step 1.c through one of the approaches below.</p>
<p>To identify a need that the project will address, agencies and/or applicants can use a variety of approaches:</p> <ul style="list-style-type: none"> <input type="checkbox"/> A. Recommended Approach: Host accessible community meetings, workshops, outreach efforts, or public meetings as part of the planning process to engage local residents and community groups for input on community or household needs, and document how the received input was considered in the design and/or selection of projects to address those needs. For more recommendations on how to make outreach efforts accessible, see the California Climate Investments guide, Best Practices for Community Engagement and Building Successful Projects.² <input type="checkbox"/> B. Recommended Approach: Receive documentation of support from local community-based organizations and/or residents (e.g., letters, emails) identifying a need that the project addresses and demonstrating that the project has broad community support; <input type="checkbox"/> C. Alternative Approach: Where direct engagement is infeasible, look at the individual factors in CalEnviroScreen that are most impacting an identified disadvantaged or low-income community (i.e., factors that score above the 75th percentile), and confirm that the project will reduce the impacts of at least one of those factors; or <input type="checkbox"/> D. Alternative Approach: Where direct engagement is infeasible, refer to the list of common needs for priority populations in CARB’s Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.

3. Does the project provide a benefit? Please refer to Step 3 of the [Sustainable Transportation Benefit Criteria Table](#) shown in Figure 4 to determine which criteria is most applicable to your project and select from the drop down list. Please also provide a written description of the benefits to the Priority Populations. Note: in the FARMER Benefits Calculator tool, the drop-down for this step is limited to criteria “A” since that is the only criteria applicable to the project types in the FARMER program.

Figure 4: Step 3 in the Sustainable Transportation Criteria Table per CARB's 2018 Funding Guidelines

Step 3: Provide a Benefit. Evaluate the project against each of the following criteria to determine if it provides direct, meaningful, and assured benefits to priority populations. **The benefit provided must directly address the need identified in Step 2.**

Project must meet at least one of the following benefit criteria:

- A. Project reduces criteria air pollutant or toxic air contaminant emissions.
- B. Project provides increased access to clean and/or shared transportation options.
- C. Project improves connectivity between travel modes.
- D. Project improves mobility between key destinations and communities.
- E. Project improves safety and comfort of the transportation system.
- F. Project improves combined housing and transportation affordability.
- G. Project improves public health through increased access to active transportation.

Table 2: Required FARMER Benefits Calculator Tool Quantification Inputs for On-Road Heavy-Duty Truck Replacement and Repower Projects

On-Road Heavy-Duty Truck Replacement and Repower Projects
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information, Baseline and Replacement Equipment/Vehicle:</u></p> <ul style="list-style-type: none"> • Two-Step Cost-Effectiveness Calculation Applicability (only for Carl Moyer Program-eligible project category and if the vehicle is used); • Number of Vehicles in Fleet; • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Quantification Period II (only for two-step eligible projects); • Annual Miles Traveled; • Engine Model Year; • Vehicle Model Year; • Vehicle Odometer Reading (only for FARMER Program-eligible project category and if the vehicle is used) • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Engine Standard (may/may not be applicable depending on engine model year); • Gross Vehicle Weight Rating; • Intended service Class; and • Other Installed Emissions Controls.

Table 3: Required FARMER Benefits Calculator Tool Quantification Inputs for Off-Road Ag Equipment Replacement and Repower Projects

Off-Road Ag Equipment Replacement and Repower Projects
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information, Baseline and Replacement Equipment/Vehicle:</u></p> <ul style="list-style-type: none"> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Vehicle Model Year; • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Engine Standard (only for LSI engines model year 2004 and newer); • Equipment Type (only for baseline equipment/vehicle; replacement equipment/vehicle is assumed to be same type as baseline); • Horsepower; and • Engine Tier (only for diesel engines).

Table 4: Required FARMER Benefits Calculator Tool Quantification Inputs for Irrigation Pumps Engine Projects

Irrigation Pumps Engines
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information, Baseline and Replacement Equipment:</u></p> <ul style="list-style-type: none"> • Two-Step Cost-Effectiveness Calculation Applicability; • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Quantification Period II (only for two-step eligible projects); • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Engine Standard (only for LSI engines model year 2004 and newer); • Equipment Type (only for baseline equipment/vehicle; replacement equipment/vehicle is assumed to be same type as baseline); • Horsepower; and • Engine Tier (only for diesel engines).

Applicants have the option of scrapping multiple baseline irrigation pumps for a single replacement. In such as case, the project becomes similar to a 2 (or more)-for-1 Off-road Equipment and Repower project.

Table 5: Required FARMER Benefits Calculator Tool Quantification Inputs for Zero-Emission Agricultural UTV Projects

Zero-Emission Agricultural UTVs
<p>Quantification Inputs (Quantification Inputs tab)</p> <p>Basic Information, Baseline and Replacement Vehicle:</p> <ul style="list-style-type: none"> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Equipment/Vehicle Model Year; • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name (only for baseline equipment; not applicable to ZEV UTV); • Engine Displacement (only for baseline equipment; not applicable to ZEV UTV); • Engine Standard (only for LSI engines model year 2004 and newer); • Equipment Type (only for baseline equipment; not applicable to ZEV UTV); • Horsepower; • Engine Tier (only for diesel baseline equipment); and • Engine Cycle Type (only for gasoline baseline equipment <25hp).

Table 6: Required FARMER Benefits Calculator Tool Quantification Inputs for Agricultural Trade-Up Projects

Agricultural Trade-Up
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information, Baseline and Replacement Equipment/Vehicle:</u></p> <ul style="list-style-type: none"> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Vehicle Model Year; • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement; • Equipment Type; • Horsepower; and • Engine Tier (only for diesel equipment).

Table 7: Required FARMER Benefits Calculator Tool Quantification Inputs for Off-road Equipment Replacement and Repower Projects: 2 (or more)-for-1

Off-road equipment replacement and repower projects: 2 (or more)-for-1
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information, Baseline and Replacement Equipment:</u></p> <ul style="list-style-type: none"> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Vehicle Model Year; • Fuel Type; • Vehicle Manufacturer; • Vehicle Model; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Engine Standard (only for LSI engines model year 2004 and newer); • Equipment Type; • Horsepower; and • Engine Tier (only for diesel engines).

Table 8: Required FARMER Benefits Calculator Tool Quantification Inputs for Infrastructure Projects

Infrastructure
<p>Quantification Inputs (Quantification Inputs tab)</p> <p><u>Basic Information:</u></p> <ul style="list-style-type: none"> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; and • Type of Off-Road Project (this refers to the type of Infrastructure project).

Note that Infrastructure cannot be a standalone project. It must be associated with one of the aforementioned project types (#1 - 4).

Table 9: Required FARMER Benefits Calculator Tool Funding Incentive Inputs for All Projects

ALL PROJECTS
<p>Basic Information on Funding Sources and Incentive Amount Calculations (Funding Inputs-Incentive Calcs tab)</p> <ul style="list-style-type: none"> • New Vehicle/Equipment Cost; • Project Funding Sources; <ul style="list-style-type: none"> ○ Funding Source; ○ Funding Amount; ○ Fiscal Year of Funding Sources; • User defined cost-effectiveness limit; • User Defined Incentive Amount; and • Notes (Optional)

Since the initial release of the FARMER Benefits tool, feedback from users continues to help shape the design and functionality of the tool. The addition of the “Project Implementation Costs” tab was meant to help users report on the associated costs with implementing the FARMER program and awarding grants. Users can specify whether an implementation cost is associated with staffing/jobs, travel, outreach, or other. Users then proceed to provide extra information regarding the types of and quality of jobs funded as well as hourly wages, fringe costs, among others. Total salary costs are calculated for the user based on the inputs.

In addition to the “Project Implementation Costs” tab, the FARMER Benefits tool now also features a “Fiscal Reporting Summary” tab. Based on the dates that users specify in the “Project Profile” tab as well as the funding source and fiscal year information inputted in the “Funding Inputs-Incentive Calcs” tab, the “Fiscal Reporting Summary” tab is meant to help users by tracking and automatically calculating the amount of funding they have under contract, have expended, and so forth. Note that if a user denotes a project as being “cancelled” in the Project Profile tab, the project is removed from the fiscal and emission reductions calculations.

For questions on the “Project Implementation Costs” tab or the “Fiscal Reporting Summary” tab, please direct them to the [FARMER program email](#).

Step 3: Estimate GHG Emission Reductions and Selected Co-Benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

Users must use the FARMER Benefits Calculator Tool to complete this step. The FARMER Benefits Calculator Tool can be downloaded from the [California Climate Investments Resources webpage](#).

Users will follow the steps outlined in Figure 5 to input information into the FARMER Benefits Calculator Tool's various tabs. Users should begin with the **Air District Info** tab, which contains general information about the Benefits Calculator Tool. Key terms used throughout the FARMER Benefits Calculator Tool are defined in the **Definitions** tab.

The **Project Profile** tab prompts users to enter general project information.

The **Quantification Inputs** tab identifies inputs required by the user, generally requiring project-specific data or assumptions. Input and output fields are color coded:

- **Green** fields indicate direct user input is required.
- **Blue** fields are optional and user input is not required.
- **Grey** fields indicate output or calculation fields that are automatically populated based on user entries and the calculation methods.
- **Yellow** fields offer helpful hints or important tips to the user.
- **Black (Black)** fields are not applicable and no user input is necessary.

The **GHG & Co-Ben Aggregate** tab displays the estimated:

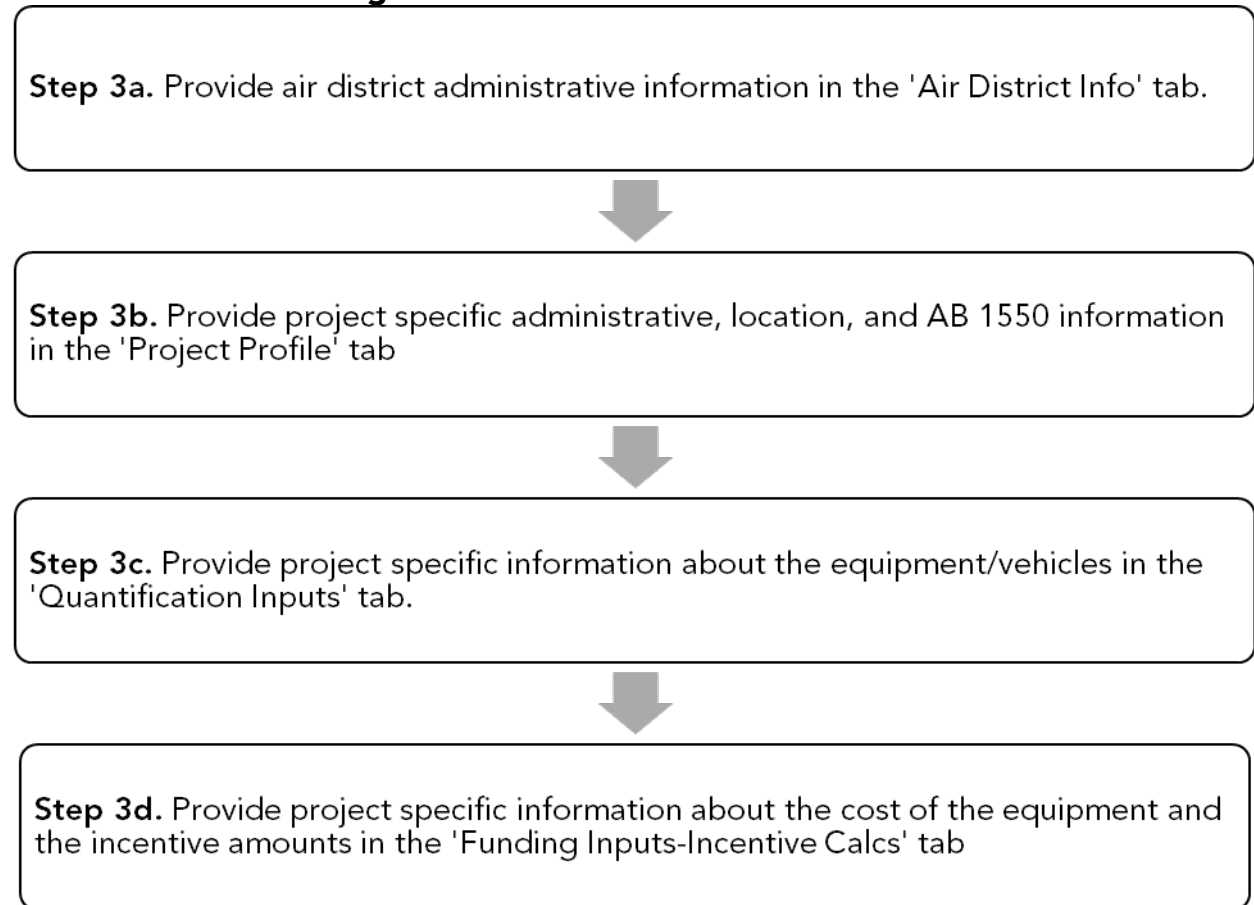
- Total GHG emission reductions by project type (metric tons of carbon dioxide equivalent (MTCO_{2e}))
 - This is the portion of GHG emission reductions attributable to funding from the FARMER Program; GHG emission reductions are prorated according to the level of program funding contributed from the FARMER Program and other California Climate Investments programs funded with GGRF, as applicable. The results in the Co-benefits Summary tab are prorated using the same approach, as applicable.
- Total Particulate Matter (PM)_{2.5} emission reductions by project type (US tons/yr, pounds(lbs)/yr) [PM_{2.5} refers to particulate matter at 2.5 microns or less.];
- Total Nitrogen Oxides (NO_x) emission reductions by project type (US tons/yr, lbs/yr);
- Total ROG (reactive organic gas) emission reductions by project type (US tons/yr, lbs/yr);
- Total Diesel PM emission reductions by project type (US tons/yr, lbs/yr);
- Total Fuel Reduction by project type (diesel gallon equivalent);

- Total Fuel Savings by project type - based on Diesel Gallon Equivalent (\$); and
- Total Fossil Fuel Energy Use Reductions (kilowatt-hours (kWh)).

In the Calculator tool, US tons/yr is denoted as “tpy”.

The tabs corresponding to GHG and Co-benefits present the results in total, but also prorated based on funding source that the FARMER Program is utilizing - e.g., prorated based on funding that comes from the Greenhouse Gas Reduction Fund (GGRF), funding that comes from other GGRF programs, funding that comes from other sources such as the Air Quality Improvement Fund (AQIF), General Fund (GF), and the Alternative and Renewable Fuel and Vehicle Technology Fund (ARFVTF); funding generated from the interest gained on these funds; among other sources.

Figure 5: Work Flow for Step 3 to Estimate the GHG Emission Reductions, Selected Co-Benefits, and Recommended Incentive Amounts for the Proposed Using the FARMER Benefits Calculator Tool



The **GHG Summary** tab displays the estimated:

- FARMER GHG emission reductions (MTCO_{2e});
- GHG emission reductions (MTCO_{2e});

The **Co-benefits Summary** tab displays the estimated:

- PM_{2.5} emission reductions (US tons/yr; lbs/yr);
- NO_x emission reductions (US tons/yr; lbs/yr);
- ROG emission reductions (US tons/yr; lbs/yr);
- Diesel PM emission reductions (US tons/yr; lbs/yr);
- Fuel Reduction (Diesel Gallon Equivalent);
- Fuel Savings - based on Diesel Gallon Equivalent (\$); and
- Fossil Fuel Energy Use Reductions (kWh).

The **Funding Inputs-Incentive Calcs** tab displays the estimated:

- Cost-effectiveness in terms of public dollars invested per ton of weighted criteria emission reductions (\$/ton);
- GHG emission reductions per FARMER GGRF funds (MTCO_{2e}/); and
- Maximum Eligible Incentive Amount (\$).

The FARMER GHG emission reductions is the portion of GHG emission reductions attributable to funding from the FARMER Program; GHG emission reductions are prorated according to the level of program funding contributed from the FARMER Program and other California Climate Investments programs funded with GGRF, as applicable. The results in the Co benefits Summary tab are prorated using the same approach, as applicable.

Section C. Example Projects

Introduction

The following are hypothetical projects to demonstrate how the FARMER Benefits Calculator Tool would be applied. These hypothetical projects do not provide examples of the supporting documentation that is required of actual project applicants. Note that the hypothetical project has not undergone verification of any FARMER Program requirements; all assumptions about location type and project features are for FARMER Benefits Calculator Tool demonstration purposes only.

Example Project I

Overview of the proposed project

The proposed project is an Ag Trade-Up project with the following features:

- New Tier 4 Final agricultural tractor being purchased by Farmer #1
- Existing Tier 3 Agricultural tractor that Farmer #1 will replace with the new Tier 4 Final tractor
- Farmer #2 that will scrap his/her Tier 0 tractor and receive Farmer #1's used Tier 3 tractor

The proposed project is located in San Joaquin County with the following project characteristics:

- Farmer #1 primarily operates his/her tractor within a Disadvantaged community
- Farmer #2 primarily operates his/her tractor within a Low-Income community

Methods to apply

Step 1: Define the Project

Define the Project in the “Project Profile” Tab

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 10: Ag Trade-Up Transaction #1 - Project Profile

FARMER Benefits Calculator Tool Headings: “Project Profile” Tab	User-Defined Inputs
Project Type	Ag Trade-Up #1
District Supplied Project ID	1
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	12345
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Carl Moyer Mailout or Advisory Date (if applicable)	[leave blank]
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Percent of Operation in District	100%
Percent of Operation in California	100%
Farm Size	≤100 acres
Would replacement have occurred without FARMER funding?	No
Project Located Within Disadvantaged Community?	Yes

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D. CARB Funding Guidelines Table 5
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A. Project reduces criteria air pollutant/toxic air contaminant emissions
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	[not filled out until project is "Completed" - see "Indicate Project Status" column]
Average Annual Use During Project Life: Units	[not filled out until project is "Completed" - see "Indicate Project Status" column]
Indicate Project Status	In-Progress
Indicate Project Status: detailed description, date of cancellation, etc.	[optional - fill out as needed]

For Ag Trade-Up projects, the next row down in the Calculator Tool is used to input information on the Traction #2 vehicle replacement.

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 11: Ag Trade-Up Transaction #2 - Project Profile

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
Project Type	Ag Trade-Up #2
District Supplied Project ID	2
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	456 ABC Road
Mailing Address: City	AnotherTestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.696455
Vehicle/Equipment Longitude (degrees)	-121.336004
Carl Moyer Guidelines Version	2017
Carl Moyer Mailout	[leave blank]
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Percent of Operation in District	100%
Percent of Operation in California	100%
Farm Size	≤100 acres
Would replacement have occurred without FARMER funding?	No
Project Located Within Disadvantaged Community?	No
Project Located Within Low-income Community or Low-income Household?	Yes

FARMER Benefits Calculator Tool Headings: “Project Profile” Tab	User-Defined Inputs
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D. CARB Funding Guidelines Table 5
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A. Project reduces criteria air pollutant/toxic air contaminant emissions
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	[not filled out until project is “Completed” - see “Indicate Project Status” column
Average Annual Use During Project Life: Units	[not filled out until project is “Completed” - see “Indicate Project Status” column
Indicate Project Status	In-Progress
Indicate Project Status: detailed description, date of cancellation, etc.	[optional - fill out as needed]

Figure 6 - Figure 10 shows how the project profile information from Table 10 - Table 11 is inputted into the tool.

Figure 6: Screenshot of Project Profile Tab - Location Information

*Project Type	*District Supplied Project ID (must be filled out for proper calculations)	*# of Baseline Equipment/Vehicle(s) being scrapped for 2 (or more)-for-1	Mailing Address: Street Number and Name	Mailing Address: City
Ag Trade-Up #1	1		123 ABC Road	TestCity
Ag Trade-Up #2	2		456 ABC Road	AnotherTestCity

Figure 7: Screenshot of Project Profile Tab - Location Information (cont.)

Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
CA	12345	37.726039	-121.229604
CA	98765	37.696455	-121.336004

Figure 8: Screenshot of Project Profile Tab - Guidelines Version, Dates, and Percent Operation

Carl Moyer Guidelines Version	Carl Moyer Mailout or Advisory Date (if applicable)	Contract Execution Date	Post-Inspection Date	Date of Payment	Percent of Operation in District	*Percent of Operation in California	Farm Size	Would replacement have occurred without FARMER funding?
2017		1/1/2019	2/1/2019	3/1/2019	100%	100%	≤100 acres	No
2017		1/1/2019	2/1/2019	3/1/2019	100%	100%	≤100 acres	No

Figure 9: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?	
Yes	No	No	D. CARB Funding Guidelines Table 5
No	Yes	No	D. CARB Funding Guidelines Table 5

Figure 10: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations (cont.)

**Written description of the identified community or household need	Benefit Criteria Met	**Written description of the benefits to priority populations	**Written description of any Project Co-benefits
<p>This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.</p>	<p>A. Project reduces criteria air pollutant/toxic air contaminant emissions</p>	<p>This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.</p>	<p>This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.</p>
<p>This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.</p>	<p>A. Project reduces criteria air pollutant/toxic air contaminant emissions</p>	<p>This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.</p>	<p>This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.</p>

Figure 11 shows four columns that are related to tracking project status. The two columns pertaining to Average Annual Use During Project Life are not activated until the project has been marked as “Completed” by the user in the “Indicate Project Status” column. The “Indicate Project Status” column is a new feature that enables users to denote whether a project is: in-progress, completed, cancelled, non-performing, or other. The fiscal information and emission reductions results are zeroed out in their respective summary tabs when a project is marked as “cancelled”. Users are highly encouraged to provide information detailing why a project was cancelled or is non-performing in the last column, “Indicate Project Status: detailed description, date of cancellation, etc.” When a project is finished and the user indicates “completed”, the user must report on the average annual usage (in miles, hrs, or kWh) for the particular piece of equipment/vehicle.

Figure 11: Project Status

Average Annual Use During Project Life:			
Numerical Value	Units	Indicate Project Status	Indicate Project Status: detailed description, date of cancellation, etc.
		In-Progress	
		In-Progress	

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the “Quantification Inputs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab.

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 12: Ag Trade-Up Transaction #1 - Quantification Inputs

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2020
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	1000
	Type of Off-Road Project	Replacement
Current (Baseline) Vehicle/Equipment	Engine Model Year	2010
	Vehicle Model Year	2010
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer ABC
	Vehicle Model	Model ABC
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Agricultural Tractors
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	200
	Tier	3
	Other installed emissions controls?	Not Applicable
Engine cycle type	Not Applicable	
New (Replacement) Vehicle/Equipment	Engine Model Year	2017
	Vehicle Model Year	2017
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer XYZ
	Vehicle Model	Model XYZ
	Vehicle Serial Number	3333
	Engine Serial Number	4444

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	250
	Tier	4_Final
	Other installed emissions controls?	Not Applicable

For Ag Trade-Up projects, the next row down in the tool is used to input information on the Transaction #2 vehicle replacement. See Figure 12 - Figure 17 which shows how the inputs listed in Table 12 - Table 13 should be entered in the tool.

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 13: Ag Trade-Up Transaction #2 - Quantification Inputs

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2020
	Quantification Period (yrs)	3
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	300
	Type of Off-Road Project	Replacement
	Engine Model Year	2000
	Vehicle Model Year	2000
	Fuel Type	Diesel

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Current (Baseline) Vehicle/Equipment	Vehicle Manufacturer	Manufacturer DEF
	Vehicle Model	Model DEF
	Vehicle Serial Number	5555
	Engine Serial Number	6666
	Engine Family Name	Test
	Engine Displacement (liters)	5
	Engine Standard	Not Applicable
	Equipment Type	Agricultural Tractors
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	175
	Tier	0
	Other installed emissions controls?	Not Applicable
	Engine cycle type	Not Applicable
New (Replacement) Vehicle/Equipment	Engine Model Year	2010
	Vehicle Model Year	2010
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer ABC
	Vehicle Model	Model ABC
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	200
Tier	3	
Other installed emissions controls?	Not Applicable	

Figure 12: Screenshot of basic information - Quantification Inputs Tab

Project Type	District Supplied Project ID	*Is project eligible for Carl Moyer 2-Step Calculation?	*Number of vehicles in Fleet	*Expected First Year of Operation	*Quantification Period (yrs)
Ag Trade-Up #1	1			2020	10
Ag Trade-Up #2	2			2020	3

Figure 13: Screenshot of basic information - Quantification Inputs Tab (cont.)

*Quantification Period II (yrs)	*Annual Miles Traveled (mi/yr)	*Annual Average hours of operation (hrs/yr)	*Type of Off-Road Project
		1000	Replacement
		300	Replacement

Figure 14: Screenshot of information for Ag Trade-Up Baseline Vehicles/Equipment - Quantification Inputs Tab

*Engine Model Year	Vehicle Model Year	Baseline Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
2010	2010		Diesel	Manufacturer ABC	Model ABC	1111	2222	Test	10
2000	2000		Diesel	Manufacturer DEF	Model DEF	5555	6666	Test	5

Figure 15: Screenshot of information for Ag Trade-Up Baseline Vehicles/Equipment - Quantification Inputs Tab (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?	*Engine cycle type
	Agricultural Tractors			200	3		
	Agricultural Tractors			175	0		

Figure 16: Screenshot of information for Ag Trade-up Replacement Vehicle/Equipment - Quantification Inputs Tab

*Engine Model Year	Vehicle Model Year	Replacement Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
2017	2017		Diesel	Manufacturer XYZ	Model XYZ	3333	4444	Test	10
2010	2010		Diesel	Manufacturer ABC	Model ABC	1111	2222	Test	10

Figure 17: Screenshot of information for Ag Trade-up Replacement Vehicle/Equipment - Quantification Inputs Tab (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?
				250	4_Final	
				200	3	

Funding Inputs in the “Funding Inputs-Incentive Calcs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 14: Ag Trade-Up Transaction #1 - Funding Inputs and Incentives Calcs

FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	User-Defined Inputs
New Vehicle/Equipment Cost (\$)	100,000
Funding Source #1 - Source	GGRF (FARMER)
Funding Source #1 - Amount (\$)	50,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #2 - Source	AQIF (FARMER)
Funding Source #2 - Amount (\$)	25,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #3 - Source	
Funding Source #3 - Amount (\$)	
FARMER allocation Fiscal Year	
User defined cost-effectiveness limit (\$/ton) [optional]	
User Defined Incentive Amount (\$)	

For the new vehicle/equipment for Trade-Up #2, the cost should include the total costs for transportation, assessment, and repair of the equipment from Trade-Up #1.

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 15: Ag Trade-Up Transaction #2 - Funding Inputs and Incentives Calcs

FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	User-Defined Inputs
New Vehicle/Equipment Cost (\$)	8,000
Funding Source #1 - Source	GGRF (FARMER)
Funding Source #1 - Amount (\$)	5,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #2 - Source	
Funding Source #2 - Amount (\$)	

FARMER Benefits Calculator Tool Headings: "Funding Inputs-Incentive Calcs" Tab	User-Defined Inputs
FARMER allocation Fiscal Year	
Funding Source #3 - Source	
Funding Source #3 - Amount (\$)	
FARMER allocation Fiscal Year	
User defined cost-effectiveness limit (\$/ton) [optional]	
User Defined Incentive Amount (\$)	5,000

Figure 18 - Figure 20 shows how the inputs from Table 14 - Table 15 are inputted into the tool.

Figure 18: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/ Equipment Cost (\$)	Funding Source #1		
			*Source	Amount (\$)	FARMER allocation Fiscal Year
Ag Trade-Up #1	1	100,000.00	GGRF (FARMER)	50,000.00	FY 2018-2019
Ag Trade-Up #2	2	8,000.00	GGRF (FARMER)	5,000.00	FY 2018-2019

Figure 19: Screenshots of Funding Inputs and Incentive Calculations tab

Funding Source #2			Funding Source #3		
*Source	Amount (\$)	FARMER allocation Fiscal Year	*Source	Amount (\$)	FARMER allocation Fiscal Year
AQIF (FARMER)	25,000.00	FY 2018-2019			

Figure 20: Screenshots of Funding Inputs and Incentive Calculations tab (cont.)

Max allowable incentive amount (\$)	Cost-effectiveness at max incentive (\$/ton)	Incentive amount based on user defined cost-effectiveness (\$)	User defined cost-effectiveness limit (\$/ton)	User defined incentive amount (\$)	Cost-effectiveness based on user defined incentive amount (\$/ton)	GHG Cost-Effectiveness (MTCO ₂ e/\$)	Notes (Optional)
80,000.00	10,631.27	-			9,966.82	-	
		-		5,000.00	3,834.35	0.00	

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 21 - Figure 23, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions for each of the 8 project types aggregated.

Figure 21: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

Project Type	GHG Reductions (MTCO ₂ e)	PM _{2.5} Reductions		NO _x Reductions	
		(tpy)	(lbs)	(tpy)	(lbs)
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-
Irrigation Pump Engines	-	-	-	-	-
ZEV_Ag_UTV	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	-	-	-	-	-
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-
Ag Trade-Up #1	26.24	0.02	369.35	0.36	7,199.07
Ag Trade-Up #2	2.95	0.01	53.97	0.23	1,389.13

Figure 22: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions	
(tpy)	(lbs)	(tpy)	(lbs)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
0.04	724.54	0.02	401.47
0.02	97.70	0.01	58.67

Figure 23: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
1,942.76	-	10,529.74	-
1.90	-	1,184.60	-

The **GHG Summary tab** displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 24 - Figure 25.

Figure 24: Screenshot of results shown in GHG Summary Tab

By project line item		Not Prorated	FARMER Program	CCI GGRF	FARMER GGRF Prorated	AQIF Prorated	APCF Prorated
Project Type	District Supplied Project ID	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)
Ag Trade-Up #1	1	26.24	26.24	26.24	17.49	8.75	-
Ag Trade-Up #2	2	2.95	2.95	2.95	2.95	-	-

Figure 25: Screenshot of results shown in GHG Summary Tab (cont.)

ARVTF Prorated	Tire Fund	GGRF (other) Prorated	Local Funding Sources Prorated	Other State Funding Sources	Other Federal Funding Sources
GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)
-	-	-	-	-	-
-	-	-	-	-	-

The **Co-Benefits Summary** tab displays changes in criteria pollutants, co-benefits, and key variables. Similar to the **GHG Summary** tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 26 - Figure 30.

Figure 26: Screenshot of results shown Co-Benefits Summary Tab

Total					
Project Type	District Supplied Project ID	Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
Ag Trade-Up #1	1	1,942.76	-	10,529.74	-
Ag Trade-Up #2	2	1.90	-	1,184.60	-

Figure 27: Screenshot of results shown Co-Benefits Summary Tab (cont.)

Total			
PM _{2.5} Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
0.02	0.36	0.04	0.02
0.01	0.23	0.02	0.01

Figure 28: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to FARMER Program

FARMER Program							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
1,942.76	-	10,529.74	-	0.02	0.36	0.04	0.02
1.90	-	1,184.60	-	0.01	0.23	0.02	0.01

Figure 29: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to GGRF

CCI GGRF							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
1,942.76	-	10,529.74	-	0.02	0.36	0.04	0.02
1.90	-	1,184.60	-	0.01	0.23	0.02	0.01

Figure 30: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to FARMER GGRF Prorated

FARMER GGRF Prorated							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
1,942.76	-	10,529.74	-	0.02	0.36	0.04	0.02
1.90	-	1,184.60	-	0.01	0.23	0.02	0.01

Administrative Step: Fiscal Reporting

Based on the dates entered in the "Project Profile" tab and on the funding amounts entered in the "Funding Inputs-Incentive Calcs" tab, users can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the "Fiscal Reporting Summary" tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the "Air District Info" tab.

Figure 31: Screenshot of Fiscal Reporting Summary tab

Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation	Total Interest and Revenue Earned (\$)
GGRF	FY 2018-2019				\$ -	
AQIF	FY 2018-2019				\$ -	

Figure 32: Screenshot of Fiscal Reporting Summary tab (cont.)

Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available	Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/liquidation
\$ 55,000.00		\$ (55,000.00)	\$ 55,000.00		\$ (55,000.00)
\$ 25,000.00		\$ (25,000.00)	\$ 25,000.00		\$ (25,000.00)

Figure 33: Screenshot of Fiscal Reporting Summary tab (cont.)

Project implementation funds expended	Implementation costs not captured in the "Project Implementation Costs" tab	Percent project implementation funding expended	Remaining balance of project implementation funds		Recaptured Funds
\$ -			\$ -		
\$ -			\$ -		

Example Project II

Overview of the proposed project

The proposed project is a 2 (or more)-for-1 involving off-road agricultural equipment:

- The applicant will be scrapping two combines and will be purchasing a single newer combine with a max rated horsepower rating higher than any of the two combines that are being scrapped.

The proposed project is located in San Joaquin County with the following project characteristics:

- The applicant primarily operates his/her tractor within a community that is characterized as disadvantaged and low-income.

Methods to apply

Step 1: Define the Project

Define the Project in the “Project Profile” Tab

Table 16: Off-Road Agricultural Equipment: 2 (or more)-for-1

FARMER Benefits Calculator Tool Headings: “Project Profile” Tab	User-Defined Inputs
Project Type	Off-Road Ag Equipment: 2 (or more)-for-1
District Supplied Project ID	112233
# of Baseline Equipment/Vehicle(s) being scrapped for 2-for-1	2
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Carl Moyer Mailout or Advisory Date (if applicable)	[leave blank]
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Percent of Operation in District	100%
Percent of Operation in California	100%
Farm Size	>100 acres
Would replacement have occurred without FARMER funding?	No
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	Yes
Project Located Within 1/2-mile Low-income Buffer Region?	No

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A. Project reduces criteria air pollutant/toxic air contaminant emissions
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	[leave blank]
Average Annual Use During Project Life: Units	[leave blank]
Indicate Project Status	In-Progress
Indicate Project Status: detailed description, date of cancellation, etc.	[optional - fill out as needed]

Figure 34 - Figure 38 shows how the project profile information from Table 16 is inputted into the tool. The tool is designed such that if the user selects a 2 (or more)-for-1 project type, he/she is prompted to input the number of baseline equipment he/she will be scrapping. This quantity then determines the number of subsequent rows in the various tool tabs that will be reserved for this single project.

Figure 34: Screenshot of Project Profile Tab -Location Information

*Project Type	*District Supplied Project ID (must be filled out for proper calculations)	*# of Baseline Equipment/ Vehicle being traded in for 2-for-1	Mailing Address: Street Number and Name	Mailing Address: City
Off-Road Ag Equipment: 2 (or more)-for-1	112233	2	123 ABC Road	Test City
Off-Road Ag Equipment: 2 (or more)-for-1				

Figure 35: Screenshot of Project Profile Tab -Location Information (cont.)

Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
CA	98765	37.726039	-121.229604

Figure 36: Screenshot of Project Profile Tab - Guidelines Version, Dates, and Percent Operation

Carl Moyer Guidelines Version	Carl Moyer Mailout or Advisory Date (if applicable)	Contract Execution Date	Post-Inspection Date	Date of Payment	Percent of Operation in District	*Percent of Operation in California	Farm Size	Would replacement have occurred without FARMER funding?
2017		1/1/2019	2/1/2019	3/1/2019	100%	100%	>100 acres	No

Figure 37: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?	
Yes	Yes	No	D. CARB Funding Guidelines Table 5

Figure 38: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations (cont.)

<p>**Written description of the identified community or household need</p>	<p>Benefit Criteria Met</p>	<p>**Written description of the benefits to priority populations</p>	<p>**Written description of any Project Co-benefits</p>
<p>This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.</p>	<p>A. Project reduces criteria air pollutant/toxic air contaminant emissions</p>	<p>This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.</p>	<p>This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.</p>

Figure 39 shows four columns that are related to tracking project status. The two columns pertaining to Average Annual Use During Project Life are not activated until the project has been marked as “Completed” by the user in the “Indicate Project Status” column. The “Indicate Project Status” column is a new feature that enables users to denote whether a project is: in-progress, completed, cancelled, non-performing, or other. The fiscal information and emission reductions results are zeroed out in their respective summary tabs when a project is marked as “cancelled”. Users are highly encouraged to provide information detailing why a project was cancelled or is non-performing in the last column, “Indicate Project Status: detailed description, date of cancellation, etc.” When a project is finished and the user indicates “completed”, the user must report on the average annual usage (in miles, hrs, or kWh) for the particular piece of equipment/vehicle.

Figure 39: Project Status

Average Annual Use During Project Life:			
Numerical Value	Units	Indicate Project Status	Indicate Project Status: detailed description, date of cancellation, etc.
		In-Progress	

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the “Quantification Inputs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab.

Table 17: First row inputs for 2 (or more)-for-1 Off-Road project. User puts inputs for first baseline vehicle and the replacement vehicle

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2020
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Replacement
Baseline Vehicle/Equipment	Engine Model Year	1992
	Vehicle Model Year	1992
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer ABC
	Vehicle Model	Model ABC
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	7.6
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	260
	Tier	0
Other installed emissions controls?	Not Applicable	
Engine cycle type	Not Applicable	
Replacement Vehicle/Equipment	Engine Model Year	2020
	Vehicle Model Year	2020
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer JKL
	Vehicle Model	Model JKL
	Vehicle Serial Number	7777
	Engine Serial Number	8888
	Engine Family Name	Test
Engine Displacement (liters)	12.9	

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	480
	Tier	4_Final
	Other installed emissions controls?	Not Applicable

Table 18: Second row inputs for 2 (or more)-for-1 Off-Road project. User puts inputs for second baseline vehicle while the inputs for the replacement vehicle are not used.

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	Not Applicable
	Quantification Period (yrs)	Not Applicable
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Not Applicable
Baseline Vehicle/Equipment	Engine Model Year	1992
	Vehicle Model Year	1992
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer XYZ
	Vehicle Model	Model XYZ
	Vehicle Serial Number	3333
	Engine Serial Number	4444
	Engine Family Name	Test
	Engine Displacement (liters)	7.6
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
Gross Vehicle Weight Rating	Not Applicable	

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
	Intended Service Class	Not Applicable
	Horsepower	260
	Tier	0
	Other installed emissions controls?	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	Engine Model Year	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Other installed emissions controls?	Not Applicable

Figure 40 - Figure 45 shows how the inputs in Table 17 - Table 18 are inputted into the tool. It is noteworthy to point out that all rows are used to ascertain the parameters pertaining the 2 baselines (along with their usage - i.e., Annual Average hours of operation). However, only the first row is needed to capture the inputs for the single replacement equipment.

Figure 40: Screenshot of basic information - Quantification Inputs Tab

Project Type	District Supplied Project ID	*Is project eligible for Carl Moyer 2-Step Calculation?	*Number of vehicles in Fleet	*Expected First Year of Operation	*Quantification Period (yrs)
Off-Road Ag Equipment: 2 (or more)-for-1	112233			2020	10
Off-Road Ag Equipment: 2 (or more)-for-1					

Figure 41: Screenshot of basic information - Quantification Inputs Tab (cont.)

*Quantification Period II (yrs)	*Annual Miles Traveled (mi/yr)	*Annual Average hours of operation (hrs/yr)	*Type of Off-Road Project
		500	Replacement
		500	

Figure 42: Screenshot of inputs for 2 baseline equipment being scrapped for 1 replacement

*Engine Model Year	Vehicle Model Year	Baseline Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
1992	1992		Diesel	Manufacturer ABC	Model ABC	1111	2222	Test	7.6
1992	1992		Diesel	Manufacturer XYZ	Model XYZ	3333	4444	Test	7.6

Figure 43: Screenshot of inputs for 2 baseline equipment being scrapped for 1 replacement (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?	*Engine cycle type
	Combines/Choppers			260	0		
	Combines/Choppers			260	0		

Figure 44: Screenshot of inputs for replacement equipment

*Engine Model Year	Vehicle Model Year	Replacement Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
2020	2020		Diesel	Manufacturer JKL	Model JKL	7777	8888	Test	12.9

Figure 45: Screenshot of inputs for replacement equipment (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?
	Combines/Choppers			480	4_Final	

Funding Inputs in the “Funding Inputs-Incentive Calcs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Table 19: Funding Inputs and Incentives Calcs

FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	User-Defined Inputs
New Vehicle/Equipment Cost (\$)	570,000
Funding Source #1 - Source	GGRF (FARMER)
Funding Source #1 - Amount (\$)	456,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #2 - Source	
Funding Source #2 - Amount (\$)	
FARMER allocation Fiscal Year	
Funding Source #3 - Source	
Funding Source #3 - Amount (\$)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit (\$/ton)	
User Defined Incentive Amount (\$)	

Figure 46 - Figure 48 show how the inputs from Table 19 are inputted into the tool.

Figure 46: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/ Equipment Cost (\$)	Funding Source #1		
			*Source	Amount (\$)	FARMER allocation Fiscal Year
Off-Road Ag Equipment: 2 (or more)-for-1	112233	570,000.00	GGRF (FARMER)	456,000.00	FY 2018-2019
Off-Road Ag Equipment: 2 (or more)-for-1					

Figure 47: Screenshots of Funding Inputs and Incentive Calculations tab

Funding Source #2			Funding Source #3		
*Source	Amount (\$)	FARMER allocation Fiscal Year	Source	Amount (\$)	FARMER allocation Fiscal Year

Figure 48: Screenshots of Funding Inputs and Incentive Calculations tab (cont.)

Max allowable incentive amount (\$)	Cost-effectiveness at max incentive (\$/ton)	Incentive amount based on user defined cost-effectiveness (\$)	User defined cost-effectiveness limit (\$/ton)	User defined incentive amount (\$)	Cost-effectiveness based on user defined incentive amount (\$/ton)	GHG Cost-Effectiveness (MTCO _{2e} /\$)
456,000.00	12,113.91	-			12,113.91	0.00

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 49 - Figure 51, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions (or an increase) for each of the 8 project types aggregated.

Figure 49: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

Project Type	GHG Reductions (MTCO ₂ e)	PM _{2.5} Reductions		NO _x Reductions	
		(tpy)	(lbs)	(tpy)	(lbs)
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-
Irrigation Pump Engines	-	-	-	-	-
ZEV_Ag_UTV	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	125.09	0.09	1,821.37	1.86	37,101.23
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-
Ag Trade-Up #1	-	-	-	-	-
Ag Trade-Up #2	-	-	-	-	-

Figure 50: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions	
(tpy)	(lbs)	(tpy)	(lbs)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
0.16	3,106.17	0.10	1,979.75
-	-	-	-
-	-	-	-
-	-	-	-

Figure 51: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
9,260.47	-	50,191.74	-
-	-	-	-
-	-	-	-
-	-	-	-

The **GHG Summary tab** displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 52 - Figure 53.

Figure 52: Screenshot of results shown in GHG Summary Tab

By project line item:		Not Prorated	FARMER Program	CCI GGRF	FARMER GGRF Prorated	AQIF Prorated	APCF Prorated
Project Type	District Supplied Project ID	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)
Off-Road Ag Equipment: 2 (or more)-for-1	112233	125.09	125.09	125.09	125.09	-	-
Off-Road Ag Equipment: 2 (or more)-for-1							

Figure 53: Screenshot of results shown in GHG Summary Tab (cont.)

ARFVTF Prorated	Tire Fund	GGRF (other) Prorated	Local Funding Sources Prorated	Other State Funding Sources	Other Federal Funding Sources
GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)	GHG Reductions (MTCO ₂ e)
-	-	-	-	-	-

The **Co-Benefits Summary** tab displays reductions (or an increase) for criteria pollutants, co-benefits, and key variables. Similar to the **GHG Summary** tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 54 - Figure 58.

Figure 54: Screenshot of results shown in Co-Benefits Summary Tab

Total					
Project Type	District Supplied Project ID	Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
Off-Road Ag Equipment: 2 (or more)-for-1	112233	9,260.47	-	50,191.74	-
Off-Road Ag Equipment: 2 (or more)-for-1					

Figure 55: Screenshot of results shown in Co-Benefits Summary Tab (cont.)

Total			
PM_{2.5} Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
0.09	1.86	0.16	0.10

Figure 56: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to FARMER Program

FARMER Program							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
9,260.47	-	50,191.74	-	0.09	1.86	0.16	0.10

Figure 57: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to GGRF

CCI GGRF							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
9,260.47	-	50,191.74	-	0.09	1.86	0.16	0.10

Figure 58: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to FARMER GGRF Prorated

FARMER GGRF Prorated							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
9,260.47	-	50,191.74	-	0.09	1.86	0.16	0.10

Administrative Step: Fiscal Reporting

Based on the dates entered in the "Project Profile" tab and on the funding amounts entered in the "Funding Inputs-Incentive Calcs" tab, users can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the "Fiscal Reporting Summary" tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the "Air District Info" tab.

Figure 59: Screenshot of Fiscal Reporting Summary tab

Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation	Total Interest and Revenue Earned (\$)
GGRF	FY 2018-2019				\$ -	

Figure 60: Screenshot of Fiscal Reporting Summary tab (cont.)

Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available	Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/ liquidation
\$ 456,000.00		\$ (456,000.00)	\$ 456,000.00		\$ (456,000.00)

Figure 61: Screenshot of Fiscal Reporting Summary tab (cont.)

Project implementation funds expended	Implementation costs not captured in the "Project Implementation Costs" tab	Percent project implementation funding expended	Remaining balance of project implementation funds	Recaptured Funds
\$ -			\$ -	

Example Project III

Overview of the proposed project

The proposed project is an Irrigation Pump Engine project with the following features:

- The applicant will be scrapping a Tier 0, diesel pump and replacing it with a Tier 3 version.
- The applicant is also installing new infrastructure in the form of power lines to support the pumps.
- The pumps and power lines occur at the same location.

The proposed project is located in San Joaquin County with the following project characteristics:

- The applicant primarily operates his/her tractor within a community that is characterized as disadvantaged.

Methods to apply

Step 1: Define the Project

Define the Project in the “Project Profile” Tab

Table 20: Irrigation Pump Engines

FARMER Benefits Calculator Tool Headings: “Project Profile” Tab	User-Defined Inputs
Project Type	Irrigation Pumps Engines
District Supplied Project ID	13579
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Carl Moyer Mailout or Advisory Date (if applicable)	[leave blank]
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Percent of Operation in District	100%
Percent of Operation in California	100%
Farm Size	≤100 acres
Would replacement have occurred without FARMER funding?	Yes
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
Community Need Addressed	D. CARB Funding Guidelines Table 5
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A. Project reduces criteria air pollutant/toxic air contaminant emissions
Written description of the benefits to priority populations	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: Newer pumps reduce maintenance costs.
Average Annual Use During Project Life: Numerical Value	[leave blank]
Average Annual Use During Project Life: Units	[leave blank]
Indicate Project Status	In-Progress
Indicate Project Status: detailed description, date of cancellation, etc.	[optional - fill out as needed]

Table 21: Infrastructure Corresponding to Irrigation Pump Engine

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
Project Type	Infrastructure (tied to project directly above)
District Supplied Project ID	Not Applicable
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Carl Moyer Mailout or Advisory Date (if applicable)	[leave blank]
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Percent of Operation in District	100%
Percent of Operation in California	100%
Farm Size	≤100 acres
Would replacement have occurred without FARMER funding?	No
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D. CARB Funding Guidelines Table 5
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by

FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	User-Defined Inputs
	the program are heavily impacted by poor air quality.
Benefit Criteria Met	A. Project reduces criteria air pollutant/toxic air contaminant emissions
Written description of the benefits to priority populations	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: Newer pumps reduce maintenance costs.
Average Annual Use During Project Life: Numerical Value	[leave blank]
Average Annual Use During Project Life: Units	[leave blank]
Indicate Project Status	In-Progress
Indicate Project Status: detailed description, date of cancellation, etc.	[optional - fill out as needed]

Figure 62 - Figure 66 shows how the project profile information from Table 20 - Table 21 is inputted into the tool.

Figure 62: Screenshot of Project Profile Tab-Location Information

*Project Type	*District Supplied Project ID (<u>must be filled out for proper calculations</u>)	*# of Baseline Equipment/Vehicle being traded in for 2-for-1	Mailing Address: Street Number and Name	Mailing Address: City
Irrigation Pump Engines	13579		123 ABC Road	TestCity
Infrastructure (tied to project directly above)			123 ABC Road	TestCity

Figure 63: Screenshot of Project Profile Tab-Location Information (cont.)

Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
CA	98765	37.726039	-121.229604
CA	98765	37.726039	-121.229604

Figure 64: Screenshot of Project Profile Tab - Guidelines Version, Dates, and Percent Operation

Carl Moyer Guidelines Version	Carl Moyer Mailout or Advisory Date (if applicable)	Contract Execution Date	Post-Inspection Date	Date of Payment	Percent of Operation in District	*Percent of Operation in California	Farm Size	Would replacement have occurred without FARMER funding?
2017		1/1/2019	2/1/2019	3/1/2019	100%	100%	≤100 acres	Yes
2017		1/1/2019	2/1/2019	3/1/2019	100%	100%	≤100 acres	No

Figure 65: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?	
Yes	No	No	D. CARB Funding Guidelines Table 5
Yes	No	No	D. CARB Funding Guidelines Table 5

Figure 66: Screenshot of Project Profile Tab - Columns regarding benefits to Priority Populations (cont.)

<p>**Written description of the identified community or household need</p>	<p>Benefit Criteria Met</p>	<p>**Written description of the benefits to priority populations</p>	<p>**Written description of any Project Co-benefits</p>
<p>This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.</p>	<p>A. Project reduces criteria air pollutant/toxic air contaminant emissions</p>	<p>This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.</p>	<p>This is an example of a written description: Newer pumps reduce maintenance costs.</p>
<p>This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.</p>	<p>A. Project reduces criteria air pollutant/toxic air contaminant emissions</p>	<p>This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.</p>	<p>This is an example of a written description: Newer pumps reduce maintenance costs.</p>

Figure 67 shows four columns that are related to tracking project status. The two columns pertaining to Average Annual Use During Project Life are not activated until the project has been marked as “Completed” by the user in the “Indicate Project Status” column. The “Indicate Project Status” column is a new feature that enables users to denote whether a project is: in-progress, completed, cancelled, non-performing, or other. The fiscal information and emission reductions results are zeroed out in their respective summary tabs when a project is marked as “cancelled”. Users are highly encouraged to provide information detailing why a project was cancelled or is non-performing in the last column, “Indicate Project Status: detailed description, date of cancellation, etc.” When a project is finished and the user indicates “completed”, the user must report on the average annual usage (in miles, hrs, or kWh) for the particular piece of equipment/vehicle.

Figure 67: Project Status

Average Annual Use During Project Life:			
Numerical Value	Units	Indicate Project Status	Indicate Project Status: detailed description, date of cancellation, etc.
		In-Progress	
		In-Progress	

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the “Quantification Inputs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab.

Table 22: First row inputs for Irrigation Pump Engines project

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	No
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2020
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Repower
Baseline Vehicle/Equipment	Engine Model Year	2000
	Vehicle Model Year	Not Applicable
	Fuel Type	Diesel
	Vehicle Manufacturer	Manufacturer JKL
	Vehicle Model	Model JKL
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	1111
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Irrigation Pump
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	100
	Tier	0
Other installed emissions controls?	Not Applicable	
Engine cycle type	Not Applicable	
Replacement Vehicle/Equipment	Engine Model Year	2020
	Vehicle Model Year	Not Applicable
	Fuel Type	Electric
	Vehicle Manufacturer	Manufacturer DEF
	Vehicle Model	Model DEF
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
Engine Standard	Not Applicable	

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Other installed emissions controls?	Not Applicable

Table 23: Second row inputs for infrastructure related to Irrigation Pump Engines project

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
Basic Information	Is project eligible for Carl Moyer 2-Step Calculation?	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2020
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	Not Applicable
	Type of Off-Road Project	All Projects
Baseline Vehicle/Equipment	Engine Model Year	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Manufacturer	Not Applicable
	Vehicle Model	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
Horsepower	Not Applicable	

FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab	User-Defined Inputs
	Tier	Not Applicable
	Other installed emissions controls?	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	Engine Model Year	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Other installed emissions controls?	Not Applicable

Figure 68 - Figure 73 shows how the inputs in Table 22 - Table 23 are inputted into the tool.

Figure 68: Screenshot of basic information - Quantification Inputs Tab

Project Type	District Supplied Project ID	*Is project eligible for Carl Moyer 2-Step Calculation?	*Number of vehicles in Fleet	*Expected First Year of Operation	*Quantification Period (yrs)
Irrigation Pump Engines	13579	No		2020	10
Infrastructure (tied to project directly above)	13579-i			2020	10

Figure 69: Screenshot of basic information - Quantification Inputs Tab (cont.)

*Quantification Period II (yrs)	*Annual Miles Traveled (mi/yr)	*Annual Average hours of operation (hrs/yr)	*Type of Off-Road Project
		500	Repower
			All Projects

Figure 70: Screenshot of inputs for baseline irrigation pump

*Engine Model Year	Vehicle Model Year	Baseline Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
2000			Diesel	Manufacturer JKL	Model JKL		1111	Test	10

Figure 71: Screenshot of inputs for baseline irrigation pump (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?	*Engine cycle type
	Irrigation Pump			100	0		

Figure 72: Screenshot of inputs for replacement irrigation pump

*Engine Model Year	Vehicle Model Year	Replacement Vehicle Odometer Reading (for Used Trucks)	*Fuel Type	Vehicle Manufacturer	Vehicle Model	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)
2020			Electric	Manufacturer DEF	Model DEF		2222	Test	10

Figure 73: Screenshot of inputs for replacement irrigation pump (cont.)

*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Other installed emissions controls?

Funding Inputs in the “Funding Inputs-Incentive Calcs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Table 24: Funding Inputs and Incentives Calcs for Irrigation Pump Engines

FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	User-Defined Inputs
New Vehicle/Equipment Cost (\$)	35,000
Funding Source #1 - Source	GGRF (FARMER)
Funding Source #1 - Amount (\$)	28,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #2 - Source	
Funding Source #2 - Amount (\$)	
FARMER allocation Fiscal Year	
Funding Source #3 - Source	
Funding Source #3 - Amount (\$)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit (\$/ton)	
User Defined Incentive Amount (\$)	28,000

Table 25: Funding Inputs and Incentives Calcs for Infrastructure

FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	User-Defined Inputs
New Vehicle/Equipment Cost (\$)	8,000
Funding Source #1 - Source	GGRF (FARMER)
Funding Source #1 - Amount (\$)	4,000
FARMER allocation Fiscal Year	FY 2018-2019
Funding Source #2 - Source	
Funding Source #2 - Amount (\$)	
FARMER allocation Fiscal Year	
Funding Source #3 - Source	
Funding Source #3 - Amount (\$)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit (\$/ton)	

FARMER Benefits Calculator Tool Headings: "Funding Inputs- Incentive Calcs" Tab	User-Defined Inputs
User Defined Incentive Amount (\$)	4,000

Figure 74 - Figure 76 show how the inputs from Table 24 - Table 25 are inputted into the tool.

Figure 74: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/ Equipment Cost (\$)	Funding Source #1		
			*Source	Amount (\$)	FARMER allocation Fiscal Year
Irrigation Pump Engines	13579	35,000.00	GGRF (FARMER)	28,000.00	FY 2018-2019
Infrastructure (tied to project directly above)	13579-i	8,000.00	GGRF (FARMER)	4,000.00	FY 2018-2019

Figure 75: Screenshots of Funding Inputs and Incentive Calculations tab

Funding Source #2			Funding Source #3		
*Source	Amount (\$)	FARMER allocation Fiscal Year	Source	Amount (\$)	FARMER allocation Fiscal Year

Figure 76: Screenshots of Funding Inputs and Incentive Calculations tab

Max allowable incentive amount (\$)	Cost-effectiveness at max incentive (\$/ton)	Incentive amount based on user defined cost-effectiveness (\$)	User defined cost-effectiveness limit (\$/ton)	User defined incentive amount (\$)	Cost-effectiveness based on user defined incentive amount (\$/ton)	GHG Cost-Effectiveness (MTCO2e/\$)	Notes (Optional)
29,750.00	2,892.94	-		28,000.00	2,722.77	0.01	
4,000.00				4,000.00		-	

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 77 - Figure 79, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions for each of the 8 project types aggregated.

Figure 77: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

Project Type	GHG Reductions (MTCO ₂ e)	PM _{2.5} Reductions		NO _x Reductions	
		(tpy)	(lbs)	(tpy)	(lbs)
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-
Irrigation Pump Engines	179.92	0.03	613.16	0.37	7,465.83
ZEV_Ag_UTV	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	-	-	-	-	-
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-
Ag Trade-Up #1	-	-	-	-	-
Ag Trade-Up #2	-	-	-	-	-

Figure 78: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions	
(tpy)	(lbs)	(tpy)	(lbs)
-	-	-	-
-	-	-	-
-	-	-	-
0.05	1,005.95	0.03	666.48
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Figure 79: Screenshots of results shown in GHG and Co-Ben Aggregate Tab (cont.)

Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
-	-	-	-
-	-	-	-
-	-	-	-
18,991.69	-	67,465.35	(262,737.96)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

The GHG Summary tab displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 80 - Figure 81.

Figure 80: Screenshot of results shown in GHG Summary Tab

By project line item:		Not Prorated	FARMER Program	CCI GGRF	FARMER GGRF Prorated	AQIF Prorated	APCF Prorated
Project Type	District Supplied Project ID	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)
Irrigation Pump Engines	13579	179.92	179.92	179.92	179.92	-	-
Infrastructure (tied to project directly above)							

Figure 81: Screenshot of results shown in GHG Summary Tab (cont.)

ARFVTF Prorated	Tire Fund	GGRF (other) Prorated	Local Funding Sources Prorated	Other State Sources	Other Federal Funding Sources
GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)
-	-	-	-	-	-

The Co-Benefits Summary tab displays changes in criteria pollutants, co-benefits, and key variables. Similar to the GHG Summary tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 82 - Figure 86.

Figure 82: Screenshot of results shown in Co-Benefits Summary Tab

Total					
Project Type	District Supplied Project ID	Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)
Irrigation Pump Engines	13579	18,991.69	-	67,465.35	(262,737.96)
Infrastructure (tied to project directly above)					

Figure 83: Screenshot of results shown in Co-Benefits Summary Tab (cont.)

Total			
PM _{2.5} Reductions (tpy)	NO _x Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
0.03	0.37	0.05	0.03

Figure 84: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions due to FARMER Program

FARMER Program							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
18,991.69	-	67,465.35	(262,737.96)	0.03	0.37	0.05	0.03

Figure 85: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions prorated just to GGRF

CCI GGRF							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
18,991.69	-	67,465.35	(262,737.96)	0.03	0.37	0.05	0.03

Figure 86: Screenshot of results shown Co-Benefits Summary Tab (cont.) - Emissions reductions prorated just to FARMER GGRF Prorated

FARMER GGRF Prorated							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings (\$)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
18,991.69	-	67,465.35	(262,737.96)	0.03	0.37	0.05	0.03

Administrative Step: Fiscal Reporting

Based on the dates entered in the "Project Profile" tab and on the funding amounts entered in the "Funding Inputs-Incentive Calcs" tab, air districts can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the "Fiscal Reporting Summary" tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the "Air District Info" tab.

Figure 87: Screenshot of Fiscal Reporting Summary tab

Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation	Total Interest and Revenue Earned (\$)
GGRF	FY 2018-2019				\$ -	

Figure 88: Screenshot of Fiscal Reporting Summary tab (cont.)

Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available	Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/ liquidation
\$ 32,000.00		\$ (32,000.00)	\$ 32,000.00		\$ (32,000.00)

Figure 89: Screenshot of Fiscal Reporting Summary tab (cont.)

Project implementation funds expended	Implementation costs not captured in the "Project Implementation Costs" tab	Percent project implementation funding expended	Remaining balance of project implementation funds	Recaptured Funds
\$ -			\$ -	

Example: Project Implementation Costs

Within the FARMER Benefits tool, the air districts can report on costs associated with implementing the program/project. For example, staff may have to travel to conduct outreach regarding the funding opportunities. Table 26 - Table 27 lists an example of how such project implementation related information should be entered into the Project Implementation Costs tab (Figure 90 - Figure 93).

Table 26: Project Implementation Costs

FARMER Benefits Calculator Tool Headings: "Project Implementation Costs" Tab	User-Defined Inputs
Implementation Cost Category	Staff/Jobs
Quarter	Q4 2019
Semi-Annual	
Funding Source	GGRF
Fiscal Year	FY 2018-2019
Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)	Air Pollution Specialist
Minimum Education Required for Position	4-Year College Completed
Minimum Job Experience Required for Position	<1 year
Total Funded Staff Hours (hrs)	160
Average Hourly Wage (\$/hr)	30
Hourly Fringe Costs (\$/hr)	10
Hourly Indirect Costs (\$/hr)	5
Salary Costs (\$/job)	32,000
Other Implementation Costs (\$)	
Employer-Paid Health Insurance	Yes
Paid Leave	Yes
Retirement Plan	Yes
Description/Justification	This is an example of a written description: Staff were needed for one month to administer the program.

Table 27: Project Implementation Costs

FARMER Benefits Calculator Tool Headings: "Project Implementation Costs" Tab	User-Defined Inputs
Implementation Cost Category	Travel
Quarter	Q4 2019
Semi-Annual	
Funding Source	GGRF
Fiscal Year	FY 2018-2019
Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)	Not Applicable
Total Funded Staff Hours (hrs)	Not Applicable
Average Hourly Wage (\$/hr)	Not Applicable
Hourly Fringe Costs (\$/hr)	Not Applicable
Hourly Indirect Costs (\$/hr)	Not Applicable
Salary Costs (\$/job)	Not Applicable
Other Implementation Cost (\$)	1,000
Employer-Paid Health Insurance	Not Applicable
Paid Leave	Not Applicable
Retirement Plan	Not Applicable
Description/Justification	This is an example of a written description: staff had to travel to public workshops and conducted outreach on the funding opportunities.

Figure 90: Screenshot of Project Implementation Costs tab filled in with inputs - Cost Category, Time Period, Funding Source, and Fiscal Year

Air District Name	Implementation Cost Category	Quarter	Semi-Annual	Funding Source	Fiscal Year
	Staff/Jobs	Q4 2019		GGRF	FY 2018-2019
	Travel	Q4 2019		GGRF	FY 2018-2019

Figure 91: Screenshot of Project Implementation Costs tab filled in with inputs - Qualification Requirements and Costs

Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)	Minimum Education Required for Position	Minimum Job Experience Required for Position	Total Funded Staff Hours (hrs)
Air Pollution Specialist	4-Year College Completed	<1 year	160

Figure 92: Screenshot of Project Implementation Costs tab filled in with inputs - Qualification Requirements and Costs (cont.)

Average Hourly Wage (\$/hr)	Hourly Fringe Costs (\$/hr)	Hourly Indirect Costs (\$/hr)	Salary Costs (\$/job)	Other Implementation Costs (\$)
\$ 30.00	\$ 10.00	\$ 5.00	\$ 7,200.00	
				\$ 1,000.00

Figure 93: Screenshot of Project Implementation Costs tab filled in with inputs - Benefits

Employer-Paid Health Insurance	Paid Leave	Retirement Plan	Description/Justification
Yes	Yes	Yes	This is an example of a written description: Staff were needed for one month to administer the program.
			This is an example of a written description: staff had to travel to public workshops and conducted outreach on the funding opportunities.