

California Air Resources Board

User Guide

**California State Transportation Agency
Transit and Intercity Rail Capital Program**

California Climate Investments



FINAL
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Table of Contents

Section A. Introduction	1
Updates.....	2
Program Assistance	2
Section B. Step-by-Step Guide	3
Overview	3
Step 1: Enter Basic Project Information	5
Step 2a: Identify the Project Subcomponent and Select the Applicable Project Type	6
Project Types	6
Step 2b: Enter Project Subcomponent-Specific Information.....	8
Step 3: Review the Estimated Benefits for the Proposed Project.....	13
Section C. Project Examples.....	14
Example Project #1	14
Example Project #2.....	23
Appendix A. Default Lookup Tables.....	38
Table 1. Required Basic Information for TIRCP Benefits Calculator Tool	5
Table 2. Required Funding Information for TIRCP Benefits Calculator Tool	8
Table 3. Required Inputs for New Service	9
Table 4. Required Inputs for System and Efficiency Improvements	10
Table 5. Required Inputs for Cleaner Vehicles/Technology/Fuels	11
Table 6. Required Inputs for Fuel/Energy Reduction.....	12
Figure 1. How Project Subcomponents and Components Combine to Create a Project	3
Figure 2. Steps to Estimating GHG Emission Reductions and Selected Co-benefits	4

List of Acronyms and Abbreviations

Acronym	Term
CARB	California Air Resources Board
CalSTA	California State Transportation Agency
CB	commuter bus
CC	cable car
CCI	California Climate Investments
CMAQ	Congestion Mitigation and Air Quality
CR	commuter rail
Diesel PM	diesel particulate matter
DMU	diesel multiple unit
DO	directly operated
DR	demand response
DT	demand response taxi
EMU	electric multiple unit
FB	ferryboat
GGRF	Greenhouse Gas Reduction Fund
GHG	greenhouse gas
hp	horsepower
HR	heavy rail
kWh	kilowatt hours
lbs	pounds
LHD1	light-heavy-duty trucks (8,501 – 10,000 lbs gross vehicle weight rating)
LR	light rail
MB	bus
MDV	medium-duty trucks (6,000 – 8,000 lbs gross vehicle weight rating)
MG	monorail/automated guideway
MJ	megajoule
MTCO _{2e}	metric tons of carbon dioxide equivalent
NO _x	nitrous oxide
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
PT	purchased transportation
RB	bus rapid transit
ROG	reactive organic gas
SR	streetcar rail
TAC	transit and connectivity
TB	trolley bus
TIRCP	Transit and Intercity Rail Program
VMT	vehicle miles traveled
VP	vanpool
YR	hybrid rail

List of Definitions

Term	Definition
Adjustment Factor	Discount factor applied to annual ridership to account for transit-dependent riders.
Baseline Vehicle	The vehicle that is currently owned/in operation that will be replaced by a new zero- or near zero-emission vehicle purchase, or the vehicle that would have been purchased if not for this project (e.g., 2022 diesel bus).
Cleaner Vehicles / Technology / Fuels	Project type that identifies project subcomponents that result in the use of cleaner vehicles, technologies, or fuels. For example, replacing existing diesel buses with electric buses or using renewable natural gas instead of fossil natural gas would be considered the “cleaner vehicles/technology/fuels” project type.
Co-benefit	A social, economic, or environmental benefit as a result of the proposed project in addition to the GHG reduction benefit.
Directly Operated	Transportation service provided directly by a transit agency, using their employees to supply the necessary labor to operate the revenue vehicles. This includes instances where an agency’s employees provide purchased transportation (PT) services to the agency through a contractual agreement.
Energy and Fuel Cost Savings	Changes in energy and fuel costs to the transit operator as a result of the project. Savings may be achieved by changing the quantity of energy or fuel used, conversion to an alternative energy or fuel source/vehicle, or renewable energy or fuel generation to displace existing fuel purchases.
Fuel/Energy Reduction	Project type that identifies project subcomponents that result in using less fuel or energy from existing transit services, or producing renewable energy/fuel. This includes projects that reduce transit VMT and idling, or generate renewable electricity. For example, optimizing bus routes to reduce diesel fuel usage or installing solar panels to displace grid electricity would be considered the “fuel/energy reduction” project type.
Key Variable	Project characteristics that contribute to a project’s GHG emission reductions and signal an additional benefit (e.g., passenger VMT reductions, renewable energy generated).

Term	Definition
New Service	Project type that identifies project subcomponents that result in a new transportation service. This may include expansion of an existing service. For example, constructing a new rail line, providing a new transit route, or adding new buses to an existing transit route that expands service would be considered the “new service” project type.
Project Component	An overarching activity which may encompass more than one project subcomponent.
Project Type	For the purposes of the TIRCP Quantification Methodology, eligible projects fall into four project types that meet the objectives program and for which there are methods to quantify GHG emission reductions.
Project Subcomponent	A project activity that corresponds to a specific project type for which GHG emission reductions and air pollutant emission co-benefits may be estimated, evaluated and reported separately from other subcomponents within a TIRCP project component.
Purchased Transportation	Transportation service provided to a public transit agency or governmental unit from a public or private transportation provider based on a written contract. The provider is obligated in advance to operate public transportation services for a public transit agency or governmental unit for a specific monetary consideration, using its own employees to operate revenue vehicles.
Quantification Period	Number of years that the project subcomponent will provide GHG emission reductions that can reasonably be achieved and assured. Sometimes referred to as “Project Life” or “Useful Life.”
Replacement	Identifies project subcomponents that replace a baseline vehicle(s) with a new vehicle(s) without resulting in new service.
System and Efficiency Improvements	Project type that identifies project subcomponents that result in increased ridership for existing routes. This may include projects that increase service levels, reliability, safety, or decrease travel times. For example, implementing integrated ticketing or improving scheduling systems would be considered the “system and efficiency improvements” project type.
Travel Cost Savings	Changes in travel costs to the user as a result of the project from switching travel modes.

Term	Definition
Unlinked Passenger Trips	The number of times passengers board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination and regardless of whether they pay a fare, use a pass or transfer, ride for free, or pay in some other way. A person riding only one vehicle from origin to destination takes one unlinked passenger trip; a person who transfers to a second vehicle takes a total of two unlinked passenger trips; a person who transfers to a third vehicle takes a total of three unlinked passenger trips. Also called boardings.

Section A. Introduction

For the CalSTA TIRCP, CARB staff developed the TIRCP Benefits Calculator Tool and accompanying TIRCP Quantification Methodology to provide guidance for estimating the GHG emission reductions and selected co-benefits of each proposed project subcomponent. This User Guide provides instructions for using the TIRCP Benefits Calculator Tool (Section B) and an example project (Section C).

The TIRCP Benefits Calculator Tool and supporting TIRCP Quantification Methodology are available for download at: www.arb.ca.gov/cci-resources. Methods and equations used in the TIRCP Benefits Calculator Tool for estimating GHG emission reductions and air pollutant emission co-benefits are provided in the TIRCP Quantification Methodology.

Using many of the same inputs required to estimate GHG emission reductions, the TIRCP Benefits Calculator Tool will estimate the following co benefits and key variables from TIRCP projects:

- ROG emission reductions (lbs),
- NO_x emission reductions (lbs),
- PM_{2.5} emission reductions (lbs),
- Diesel PM emission reductions (lbs),
- Passenger VMT reductions (miles),
- Fossil fuel use reductions (gallons),
- Fossil fuel energy use reductions (kWh),
- Passenger travel cost savings (\$), and
- Energy and fuel cost savings (\$).

Key variables are project characteristics that contribute to a project's GHG emission reductions and signal an additional benefit (e.g., passenger VMT reductions, fossil fuel use reductions). Additional co-benefits for which CARB assessment methodologies were not incorporated into the TIRCP Benefits Calculator Tool may also be applicable to the project. Applicants should consult the TIRCP guidelines, solicitation materials, and agreements to ensure they are meeting TIRCP requirements. All CARB co-benefit assessment methodologies are available at: www.arb.ca.gov/cci-cobenefits.

Updates

CARB staff periodically reviews 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 TIRCP Benefits Calculator Tool was updated to include:

- Added inputs for up to three subcomponents per Quantifiable Component;
- Separated inputs for “Displaced Vehicle” and “Fuel/Energy Reduction”;
- For “New Service” project types, allowed optional inputs for vehicle replacement and fuel/energy reduction;
- For “System and Efficiency Improvements” and “Cleaner Vehicles/Technology/Fuels” project types, allowed optional inputs for fuel/energy reduction;
- Added “DMU / EMU” as an eligible vehicle type.
- Added Travel Cost Savings co-benefit inputs and calculations;
- Added Fuel Cost Savings co-benefit calculations; and
- Updated project examples to include other, more complex project types.

Program Assistance

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

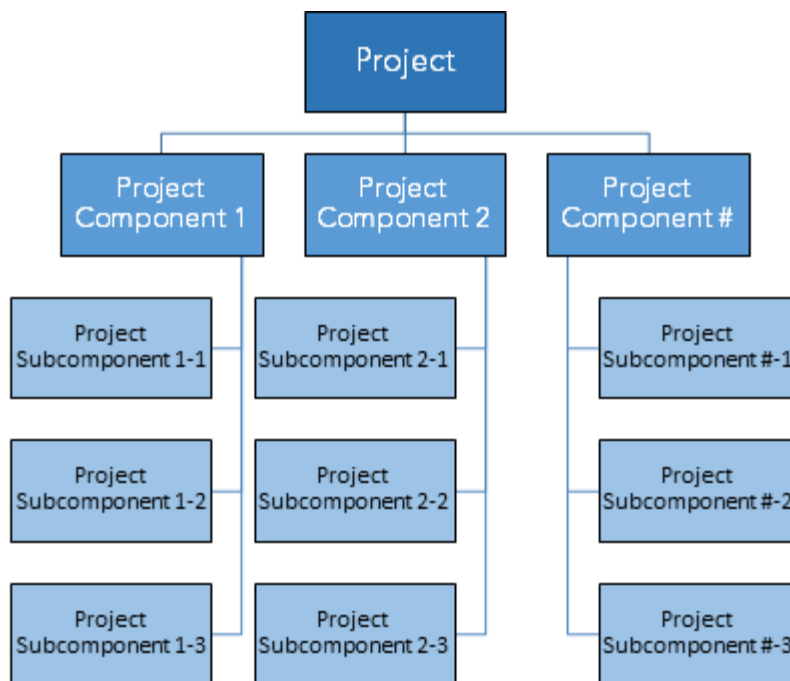
- Questions on this document should be sent to: GGRFProgram@arb.ca.gov.
- For more information on CARB’s efforts to support implementation of California Climate Investments, see: www.arb.ca.gov/auctionproceeds.
- Questions pertaining to TIRCP should be sent to: TIRCPcomments@dot.ca.gov.

Section B. Step-by-Step Guide

Overview

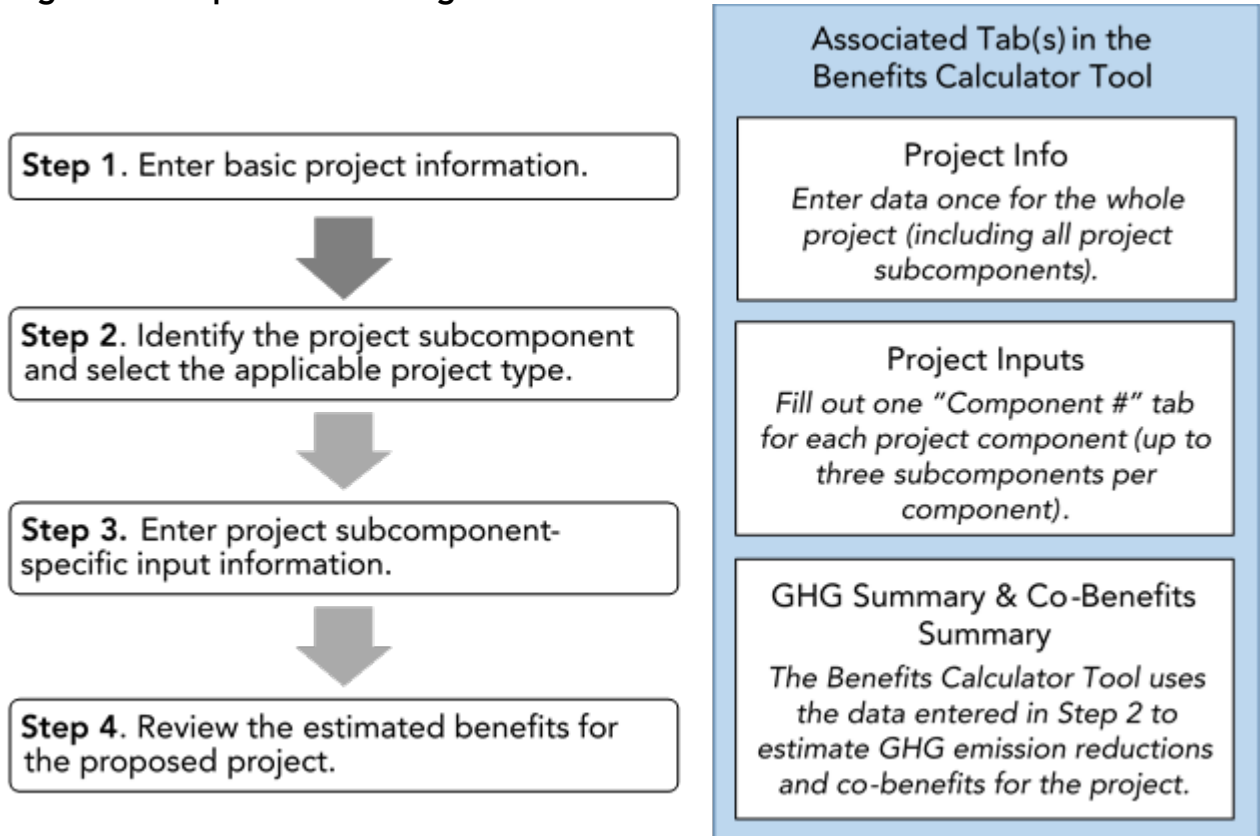
For quantification purposes, a **project** is the combination of multiple **project components**, which can be comprised of multiple **project subcomponents** (see Figure 1). The current TIRCP Benefits Calculator Tool allows inputs for six components, and three subcomponents per component, for a total of 18 subcomponents.

Figure 1. How Project Subcomponents and Components Combine to Create a Project



Applicants will follow the steps outlined in Figure 2 to estimate the GHG emission reductions and selected co-benefits from the proposed project. Detailed instructions for each step are provided on subsequent pages. Examples showing how to use the tool with a sample project is included in Section C.

Figure 2. Steps to Estimating GHG Emission Reductions and Selected Co-benefits



Step 1: Enter Basic Project Information

Applicants must use the TIRCP Benefits Calculator Tool to complete this step. The TIRCP Benefits Calculator Tool can be downloaded from: www.arb.ca.gov/cci-resources.

Users should begin with the **Read Me** tab, which contains general information about the Benefits Calculator Tool. The **Documentation** tab provides details on the documentation required to allow the calculations to be reviewed and replicated.

In Step 1, input basic project information, including contact information and total project costs in the **Project Info** tab. Table 1 identifies the required basic project information needed in the Project Info tab.

Table 1. Required Basic Information for TIRCP Benefits Calculator Tool

ALL PROJECT TYPES
<p>General Information (Project Info worksheet)</p> <ul style="list-style-type: none"> • Project Name; • Lead Agency Name; • Contact Name; • Contact Phone Number; • Contact Email; • Date Calculator Completed; • TIRCP GGRF Funds Requested (Total amount of TIRCP GGRF funds requested from this solicitation to implement the project);

Step 2: Identify the Project Subcomponent and Select the Applicable Project Type

In Step 2, identify the Project Subcomponents that will be quantified in the **Quantifiable Component #** tab(s) and the funds requested for that subcomponent. Then, select from the dropdown menu the Project Type that aligns with that project element. Only quantify activities that are directly funded and assured by the project; do not include activities outside the scope of the funded tasks.

Project Types

TIRCP funds capital improvements that will modernize California's intercity, commuter, and urban rail (train), bus, ferry, shuttle bus, and vanpool transit systems. These capital improvements reduce GHG emissions, improve/expand transit service, increase ridership, integrate existing bus and rail operations with each other and with high-speed rail, and improve safety.

For the purposes of this TIRCP Quantification Methodology, CARB defined four **Project Types** that meet the objectives of TIRCP and for which there are methods to quantify GHG emission reductions.¹ Each project requesting GGRF funding must include at least one of the following project types:

1. New Service
2. System and Efficiency Improvements²
3. Cleaner Vehicles/Technology/Fuels
4. Fuel/Energy Reduction

Some projects may include more than one project type, such as those that provide operational improvements that reduce travel time (generating ridership increases) and also deploy new, lower-emitting vehicles that replace current, higher-emitting vehicles; or those that involve different types of baseline or replacement vehicles. If more than one project type applies to the project, information can be entered in different sub-component columns or component tabs.

Once a project type is selected in the TIRCP Benefits Calculator Tool, the appropriate TIRCP quantification method for estimating GHG emission reductions and selected co-benefits will automatically apply and indicate what further information is required, optional, or not required in the **Quantifiable Component #** tab(s). Some project types

¹ California State Transportation Agency (2019). Transit and Intercity Rail Capital Program Guidelines. Available at: <http://www.dot.ca.gov/drrmt/sptircp.html>.

² Project impacts that increase ridership on other services through increased transfers of passengers may be reflected as System and Efficiency Improvements only if the project also documents the ability of the connected corridor to provide capacity sufficient to accommodate the riders. If additional service must be operated by the adjoining operator, the operation of such service must be included using the "New Service" project type.

may allow optional quantification of other project types within a single subcomponent. For “New Service” project types, applicants may additionally enter information for “Cleaner Vehicles / Technology / Fuels” and “Fuel/Energy Reduction” within the same subcomponent column. For “System and Efficiency Improvements” and “Cleaner Vehicles / Technology / Fuels” project types, applicants may additionally enter information for “Fuel/Energy Reduction” within the same subcomponent column.

Step 3: Enter Project Subcomponent-Specific Information

In Step 2b, fill out all of the required information—and if applicable or desired, any optional information—in the **Quantifiable Component #** tab(s). If an optional field is used, the applicant must submit additional supporting documentation (see the **Documentation** tab in the TIRCP Benefits Calculator Tool).

Input and output fields are color-coded:

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

Unless otherwise specified, if values are expected to vary between the first and final year of operation or across a fleet of vehicles, an average value may be used.

Table 2 identifies the required funding information needed in the **Quantifiable Component #** tab(s) in order to prorate the GHG emission reductions and selected co-benefits in the TIRCP Benefits Calculator Tool.

Table 2. Required Funding Information for TIRCP Benefits Calculator Tool

ALL PROJECT TYPES
<p>Funding Information (Quantifiable Component # worksheets)</p> <ul style="list-style-type: none"> • Identifying Descriptor (ID); • TIRCP Funds Requested (\$) (Total amount of TIRCP GGRF funds requested from this solicitation to implement the project); • Total Project Cost (\$) (Total amount of funding required to implement the project); • CCI Program, if applicable; • Additional GGRF Funds (\$), if applicable (amount of GGRF funds previously awarded or expected to be requested in the future to the project from TIRCP or another California Climate Investments program); • CCI Program, if applicable; • Additional GGRF Funds (\$), if applicable (amount of GGRF funds previously awarded or expected to be requested in the future to the project from TIRCP or another California Climate Investments program);

Table 3 identifies the required data inputs needed in the **Quantifiable Component #** tab(s) to estimate the GHG emission reductions and selected co-benefits with the TIRCP Benefits Calculator Tool for project subcomponents that fit the “New Service” project type.

Table 3. Required Inputs for New Service

Applicable Project Type:
<ul style="list-style-type: none"> • New Service
<p>Quantification Inputs (Quantifiable Component # worksheets)</p> <ul style="list-style-type: none"> • Section to determine the quantification method and emission factors to use to estimate emission reductions: <ul style="list-style-type: none"> ○ Project Type; ○ Service Type; ○ Type of Region; ○ Region; ○ Year 1 (Yr1) [first year of operation]; ○ Year F (YrF) [final year of operation]; • Section to estimate the emission reductions from displaced auto vehicle miles traveled: <ul style="list-style-type: none"> ○ Yr1 Ridership; ○ YrF Ridership; ○ Adjustment Factor [Discount factor applied to annual ridership to account for transit-dependent riders. Refer to Appendix A for default values.]; ○ Length of Average Trip [in miles]; • Section to estimate the net emission reductions from new service as a result of the proposed project: <ul style="list-style-type: none"> ○ Vehicle Type; ○ Engine Tier, if applicable; ○ Engine Horsepower, if applicable; ○ Fuel Type; ○ Hybrid Vehicle (yes/no); ○ Model Year, if applicable; ○ Project Specific Emission Factor, optional; ○ Annual VMT, if applicable; ○ Annual Fuel, if applicable; • Section to estimate the travel cost savings as a result of the proposed project: <ul style="list-style-type: none"> ○ New Average One-Way Fare Cost, optional; ○ Average Transit Facility Parking Cost, optional; ○ Average Avoided Parking Cost, optional; and ○ Average Avoided Toll Cost, optional.

Table 4 identifies the required data inputs needed in the **Quantifiable Component #** tab(s) to estimate the GHG emission reductions and selected co-benefits with the TIRCP Benefits Calculator Tool for project subcomponents that fit the “System and Efficiency Improvements” project type.

Note that project impacts that increase ridership on other services through increased transfers of passengers may be reflected as System and Efficiency Improvements only if the project also documents the ability of the connected corridor to provide capacity sufficient to accommodate the riders. If additional service must be operated by the adjoining operator, the operation of such service must be included using the “New Service” project type.

Table 4. Required Inputs for System and Efficiency Improvements

<p>Applicable Project Type:</p> <ul style="list-style-type: none"> • System and Efficiency Improvements
<p>Quantification Inputs (Quantifiable Component # worksheets)</p> <ul style="list-style-type: none"> • Section to determine the quantification method and emission factors to use to estimate emission reductions: <ul style="list-style-type: none"> ○ Project Type; ○ Service Type; ○ Type of Region; ○ Region; ○ Year 1 (Yr1) [first year of operation]; ○ Year F (YrF) [final year of operation]; • Section to estimate the emission reductions from displaced auto vehicle miles traveled: <ul style="list-style-type: none"> ○ Yr1 Ridership; ○ YrF Ridership; ○ Adjustment Factor [Discount factor applied to annual ridership to account for transit-dependent riders. Refer to Appendix A for default values.]; ○ Length of Average Trip [in miles]; • Section to estimate the travel cost savings as a result of the proposed project: <ul style="list-style-type: none"> ○ Baseline Average One-Way Fare Cost, optional; ○ New Average One-Way Fare Cost, optional; ○ Average Transit Facility Parking Cost, optional; ○ Average Avoided Parking Cost, optional; and ○ Average Avoided Toll Cost, optional.

Table 5 identifies the required data inputs needed in the **Quantifiable Component #** tab(s) to estimate the GHG emission reductions and selected co-benefits with the TIRCP Benefits Calculator Tool for project subcomponents that fit the “Cleaner Vehicles/Technology/Fuels” project type.

For projects that involve multiple types of baseline or replacement vehicles or for projects that phase in replacement vehicles over time, more than one subcomponent column or component tab may be used to enter information about each type of vehicle. Specifically, for different baseline and replacement vehicle fuel type combinations, it is recommended to enter information into separate subcomponent columns or component tabs. However, for different baseline or replacement vehicle model years, it is recommended to assume an average model year.

Table 5. Required Inputs for Cleaner Vehicles/Technology/Fuels

<p>Applicable Project Type:</p> <ul style="list-style-type: none"> • Cleaner Vehicles/Technology/Fuels
<p>Quantification Inputs (Quantifiable Component # worksheets)</p> <ul style="list-style-type: none"> • Section to determine the quantification method and emission factors to use to estimate emissions: <ul style="list-style-type: none"> ○ Project Type; ○ Service Type; ○ Type of Region; ○ Region; ○ Year 1 (Yr1) [first year of operation]; ○ Year F (YrF) [final year of operation]; • Section to estimate the net emission reductions from new cleaner vehicles/technology/fuel as a result of the proposed project: <ul style="list-style-type: none"> ○ Vehicle Type [of the new vehicle(s)]; ○ Engine Tier [of the new vehicle(s)], if applicable; ○ Engine Horsepower [of the new vehicle(s)], if applicable; ○ Fuel Type [of the new vehicle(s)]; ○ Hybrid Vehicle [of the new vehicle(s)]; ○ Model Year [of the new vehicle(s)], if applicable; ○ Project Specific Emission Factor [of the new vehicle(s)], optional; ○ Annual VMT [of the new vehicle(s)], if applicable; ○ Annual Fuel Use [of the new vehicle(s)], if applicable; • Section to estimate the net emission reductions from the baseline vehicle as a result of the proposed project: <ul style="list-style-type: none"> ○ Vehicle Type [of the baseline vehicle(s)]; ○ Engine Tier [of the baseline vehicle(s)], if applicable; ○ Engine Horsepower [of the baseline vehicle(s)], if applicable; ○ Fuel Type [of the baseline vehicle(s)]; ○ Model Year [of the baseline vehicle(s)], if applicable; ○ Annual VMT [of the baseline vehicle(s)], if applicable; ○ Annual Fuel Use [of the baseline vehicle(s)], if applicable;

Table 6 identifies the required data inputs needed in the **Quantifiable Component #** tab(s) to estimate the GHG emission reductions and selected co-benefits with the TIRCP Benefits Calculator Tool for project subcomponents that fit the “Fuel/Energy Reduction” project type.

For projects that generate renewable electricity using solar photovoltaic panels, applicants should use the PVWatts® Calculator to estimate the energy production from a solar installation³, and input the result into Annual Fuel Use. See the TIRCP Quantification Methodology for more details, available at: www.arb.ca.gov/cii-resources.

Note that facility energy efficiency improvements are not eligible for quantification and should not be inputted into the Benefits Calculator Tool.

Table 6. Required Inputs for Fuel/Energy Reduction

Applicable Project Type:
<ul style="list-style-type: none"> • Fuel/Energy Reduction
<p>Quantification Inputs (Quantifiable Component # worksheets)</p> <ul style="list-style-type: none"> • Section to determine the quantification method and emission factors to use to estimate emissions: <ul style="list-style-type: none"> ○ Project Type; ○ Service Type; ○ Type of Region; ○ Region; ○ Year 1 (Yr1) [first year of operation]; ○ Year F (YrF) [final year of operation]; • Section to estimate the net emission reductions from fuel/energy reduction as a result of the proposed project: <ul style="list-style-type: none"> ○ Vehicle Type; ○ Engine Tier, if applicable; ○ Fuel Type; ○ Model Year, if applicable; ○ Annual Fuel Use;

³ From PVWatts® tool, which can be accessed at: <http://pvwatts.nrel.gov/>. The calculator includes a solar degradation rate of 0.5% per year for calculating total lifetime energy generation

Step 4: Review the Estimated Benefits for the Proposed Project

In Step 4, review the **GHG Summary** and **Co-benefits Summary** tabs to view the GHG emission reductions and selected co-benefit estimates of the proposed project. If there are any errors, ensure that all of the information from Steps 1 and 2 (in the **Project Info** and **Quantifiable Component #** tab(s)) has been entered correctly and to the best of the applicant's ability.

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

- Total TIRCP GHG emission reductions (metric tons of carbon dioxide equivalent (MTCO_{2e})),⁴
- Total GHG emission reductions (MTCO_{2e}),
- Total GHG emission reductions per total TIRCP GGRF funds (MTCO_{2e}/\$million), and
- Total GHG emission reductions per total GGRF funds (MTCO_{2e}/\$million).

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

- ROG emission reductions (lbs),
- NO_x emission reductions (lbs),
- PM_{2.5} emission reductions (lbs),
- Diesel PM emission reductions (lbs),
- Passenger VMT reductions (miles),
- Fossil fuel use reductions (gallons),
- Fossil fuel energy use reductions (kWh),
- Energy and fuel cost savings (\$), and
- Passenger travel cost savings (\$).

⁴ This is the portion of GHG emission reductions attributable to funding from TIRCP. GHG emission reductions are prorated according to the level of program funding contributed from TIRCP 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. Project Examples

Introduction

The following are hypothetical projects⁵ to demonstrate how the TIRCP Benefits Calculator Tool would be applied. This hypothetical projects do not provide examples of the supporting documentation that are required of actual project applicants.

Example Project #1

Overview of the Proposed Project

The lead agency plans to expand the existing weekday commuter rail service by adding four round-trips per day. The project will also reduce idling times for an existing connector route, which is expected to reduce diesel fuel use. Therefore, the proposed project entails a “New Service” and “Fuel/Energy Reduction”, having the following features:

- Operates predominantly within the Sacramento Valley air basin
- First year (Yr1) of service: 2025
- Final year (YrF) of service: 2055
- Yr1 Ridership: 62,400
- YrF Ridership: 400,000
- Length of Average Trip (L): 40 miles
- Vehicle Type: Heavy rail
- Fuel Type: Renewable Diesel
- Annual VMT: additional 112,000 miles estimated to operate the expanded service
- First year (Yr1) of fuel reduction: 2025
- Final year (YrF) of fuel reduction: 2035
- Annual Fuel Reduction: 17,500 gallons of diesel from reduced idling times
- TIRCP funds requested: \$9,000,000
- Additional non-TIRCP GGRF funds requested: \$1,500,000 from LCTOP
- New Average One-Way Fare Cost per Rider: \$12.00/Trip
- Average Transit Facility Parking Cost per Rider: \$3.00/Trip
- Average Avoided Parking Cost for Riders: \$5.00/Trip

⁵ The hypothetical projects have not undergone verification of any TIRCP requirements; all assumptions about location and project features are for TIRCP Benefits Calculator Tool demonstration purposes only.

Methods to Apply

Step 1: Enter Basic Project Information

Review the Read Me tab and User Guide before beginning.

Enter the relevant information about the project into the “Project Info” tab.

General Information (Project Info Tab)	
<ul style="list-style-type: none"> Project Name: Expanded Commuter Express Service Lead Agency Name: Sacramento Transit Contact Name: John Smith Contact Phone Number: (916) 555-1234 Contact Email: john.smith@sactransit.org Date Calculator Completed: 1/15/2019 	

Once the data has been entered, the “Project Info” tab should appear as follows:

Information	Inputs
Project Name:	Expanded Commuter Express Service
Lead Agency Name:	Sacramento Transit
Contact Name:	John Smith
Contact Phone Number:	(916) 555-1234
Contact Email:	john.smith@sactransit.org
Date Calculator Completed:	1/15/2019

The next steps entail filling out the **Quantifiable Component #** tabs. Because there is one project component (with two subcomponents), the applicant will fill out one of these tabs.

Step 2: Identify the Project Subcomponent and Select the Applicable Project Type

The project consists of two subcomponents: a “New Service” project type and a “Fuel/Energy Reduction” project type.

Step 3: Enter Project Subcomponent-Specific Information

Enter the project information into the TIRCP Calculator Tool **Quantifiable Component 1** tab to estimate GHG emission reductions and other benefits.

Calculator Inputs (Quantifiable Component 1 Tab)	
Subcomponent 1	Subcomponent 2
<p>Funding Inputs:</p> <ul style="list-style-type: none"> Identifying Descriptor (ID): Rail Expansion TIRCP Funds Requested (\$): \$9,000,000 Total Project Cost (\$): \$40,000,000 CCI Program: Caltrans - LCTOP Additional GGRF Funds (\$): \$1,500,000 CCI Program: Additional GGRF Funds (\$): <p>Project Info Inputs:</p> <ul style="list-style-type: none"> Project Type: New Service Service Type: Rail Type of Region: Air Basin Region: Sacramento Valley Year 1 (Yr1): 2025 Year F (YrF): 2055 <p>Displaced Passenger Auto VMT Inputs:</p> <ul style="list-style-type: none"> Yr1 Ridership: 62,400 YrF Ridership: 400,000 Adjustment Factor (A): 0.867 Length of Average Trip (L, miles): 40 <p>New Service Vehicle Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Heavy Rail Engine Tier: Tier 4 Fuel Type: Renewable Diesel Hybrid Vehicle: No Annual VMT: 112,000 <p>Travel Cost Savings Inputs:</p> <ul style="list-style-type: none"> New Average One-Way Fare Cost: \$12.00 Average Transit Facility Parking Cost: \$3.00 Average Avoided Parking Cost: \$5.00 Average Avoided Toll Cost: \$0.00 	<p>Funding Inputs:</p> <ul style="list-style-type: none"> Identifying Descriptor (ID): Idling Reduction TIRCP Funds Requested (\$): \$500,000 Total Project Cost (\$): \$500,000 CCI Program: Additional GGRF Funds (\$): CCI Program: CARB - Clean Truck & Bus Additional GGRF Funds (\$): \$300,000 <p>Project Info Inputs:</p> <ul style="list-style-type: none"> Project Type: Fuel/Energy Reduction Service Type: Rail Type of Region: Air Basin Region: Sacramento Valley Year 1 (Yr1): 2025 Year F (YrF): 2035 <p>Fuel/Energy Reduction Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Heavy Rail Engine Tier: Tier 2 Fuel Type: Diesel Annual Fuel Use: 17,500

Once the data has been entered, the **Quantifiable Component 1** tab should look like the following:

Input	Description	Quantified Component 1: Subcomponent 1	Quantified Component 1: Subcomponent 2
Identifying Descriptor (ID)	Brief description of the quantifiable component identifying it from other separable components.	Rail Expansion	Idling Reduction
Funding Inputs			
TIRCP Funds Requested (\$)	Total TIRCP funds requested for this separable component.	\$9,000,000	\$500,000
Total Project Cost (\$)	Total cost of this separable component.	\$40,000,000	\$500,000
Additional CCI Program 1, if applicable			
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.	Caltrans - LCTOP	
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 1.	\$1,500,000	
Additional CCI Program 2, if applicable			
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.		
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 2.		
Total GGRF Funds Requested (\$)	Total GGRF funds requested from all CCI Programs	\$10,500,000	\$500,000
Project Info Inputs		Input	Input
Project Type	For the purposes of this quantification, eligible TIRCP projects fall into four project types. Select the project type that best describes this component.	New Service	Fuel/Energy Reduction
Service Type	The transit service (e.g., Intercity/Express Bus (Long Distance), Light Rail, Vanpool, etc.) directly associated with the proposed project. For projects that serve multiple services, select Multi-modal.	Rail	Rail
Type of Region	The type of region that best encompasses the geographic location for the proposed project type.	Air Basin	Air Basin
Region	The County or Air Basin where the majority of the service occurs.	Sacramento Valley	Sacramento Valley
Year 1 (Yr1)	The first year of service or the first year the facility or rolling stock will be in use.	2025	2025
Year F (YrF)	The final year of service or the final year the facility or rolling stock's useful life.	2055	2035
Useful Life (yrs)	The number of years the service is funded or the useful life of the facility or rolling stock. Limited to up to 50 years.	30	10

Displaced Passenger Auto VMT Inputs		Input	Documentation	Input	Documentation
Yr1 Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the first year (Yr1).	62,000	0.25% increase based on historical trends		
YrF Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the final year. If the ridership is not expected to change, Yr1 and YrF should be the same value.	400,000	1.6% increase based on historical trends		
Adjustment Factor	Discount factor applied to annual ridership to account for transit-dependent riders. <u>Use:</u> Document project-specific data or system average developed from a recent, statistically valid survey or default.	0.867	Default for commuter rail		
Length of Average Trip (mi)	Annual passenger miles over unlinked trips directly associated with the proposed project.	11.48	From NTD default table		
New Service Vehicle Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) that will operate the new service or will be procured.	Heavy Rail			
Engine Tier	The engine tier for the vehicle(s) that will operate the new service.	Tier 4			
Engine Horsepower	The engine horsepower rating for the vehicle(s) that will operate the new service.				
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the vehicle for the new service, or of the new vehicle(s) to be procured.	Renewable Diesel			
Hybrid Vehicle	Is the vehicle for the new service, or vehicle(s) to be procured, a hybrid?	No			
Model Year	The engine model year of the vehicle that will operate the new service, or of the new vehicle(s) to be procured.				
Project-Specific GHG Emission Factor (gCO2e/MJ)	If used, applicant must be able to demonstrate an approved carbon intensity value under the Low Carbon Fuel Standard and submit additional documentation.				
Annual VMT (mi/yr)	The estimated annual VMT required to operate the new service or of the new vehicle(s) to be procured (e.g., 72,000). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.	56,000	20 mi service length * 8 end-to-end trips/day * 350 days/yr		
Annual Fuel	The estimated annual fuel (i.e., gallon of diesel, kWh of electricity) required to operate the new service, or of the new rail or ferry vehicle(s) to be procured (e.g., 26,000). Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.				

Baseline Vehicle Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the baseline vehicle(s).				
Engine Tier	The engine tier of the baseline vehicle(s).				
Engine Horsepower	The engine horsepower rating of the baseline vehicle(s).				
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the baseline vehicle(s).				
Model Year	The average engine model year(s) of the baseline vehicle(s).				
Annual VMT (mi/yr)	The estimated annual VMT of the baseline vehicle(s). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.				
Annual Fuel	The estimated annual fuel the baseline vehicle(s) would have required to operate the equivalent as the new vehicle to be procured. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.				
Fuel/Energy Reductions Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the displaced vehicle(s).			Heavy Rail	
Engine Tier	The engine tier of the displaced vehicle(s).			Tier 2	
Engine Horsepower	The engine horsepower rating of the displaced vehicle(s).				
Fuel Type	The fuel/energy type (e.g., diesel, grid electricity, etc.) being reduced as a result of the project.			Diesel	
Model Year	The average engine model year(s) of the vehicle(s) to realize fuel/energy reductions as a result of the project.				
Annual Fuel	The estimated annual fuel/energy reductions expected to be realized as a result of the project. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.			17,500	50 gallons/day * 350 days/yr

Travel Cost Savings Inputs		Input	Documentation	Input	Documentation
Baseline Average One-Way Fare Cost (\$/Trip/Rider)	The average fare cost per trip per rider prior to project implementation. If expanding service, baseline fare cost is zero.				
New Average One-way Fare Cost (\$/Trip/Rider)	The new expected average fare cost per trip per rider resulting from the proposed project.	\$12.00	Expected fare cost		
Average Transit Facility Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would pay at the transit facility where the trip originates. Consider that not all transit riders may use the parking. However, the calculations will already take into account that parking is only paid once per round trip.	\$3.00	Current average parking rate		
Average Avoided Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that parking is only paid once per round trip.	\$5.00	Average cost in downtown Sacramento (\$10), and assuming only half of riders pay for parking		
Average Avoided Toll Cost (\$/Trip/Rider)	The average expected cost of tolls per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that tolls are only paid once per round trip.	\$0.00	Service does not pass through any toll road		

Once all project subcomponent inputs are complete, follow Step 4.

Step 4: Review the Estimated Benefits for the Proposed Project

The **GHG Summary** tab displays the Total GHG Emission Reductions per Total TIRCP GGRF Funds and per Total GGRF Funds. GHG emission reductions are prorated according to the level of program funding contributed from TIRCP and other California Climate Investments programs, as applicable.

	Quantified GHG Component 1
Identifying Descriptor	Rail Expansion; Idling Reduction
GHG Emission Reduction Start Date (Year)	2025; 2025
Total CCI	
Total GHG Emission Reductions (MTCO _{2e})	10,641
Total GGRF Funds Requested (\$)	\$11,000,000
Total GHG Emission Reductions/Total GGRF Funds Requested (MTCO _{2e} /\$)	0.000967
TIRCP	
TIRCP GHG Emission Reductions (MTCO _{2e})	9,190
TIRCP Funds Requested (\$)	\$9,500,000
TIRCP GHG Emission Reductions/TIRCP Funds Requested (MTCO _{2e} /\$)	0.000967
TIRCP Funds Requested/TIRCP GHG Emission Reductions (\$/MTCO _{2e})	1,034
Additional CCI Program 1	
CCI Program	Caltrans - LCTOP
GHG Emission Reductions Attributable to other GGRF Programs (MTCO _{2e})	1,451
Total Additional GGRF Funds to Implement Project (\$)	\$,1500,000
Additional CCI Program 2	
CCI Program	
GHG Emission Reductions Attributable to other GGRF Programs (MTCO _{2e})	
Total Additional GGRF Funds to Implement Project (\$)	

The **Co-benefits Summary** tab displays the key variables and air pollutant emission estimates from the project. Key variables and air pollutant emission estimates are also prorated according to the level of program funding contributed from TIRCP and other California Climate Investments programs, as applicable.

	Quantified Co-Benefit Component 1
Identifying Descriptor	Rail Expansion; Idling Reduction
Total CCI	
Passenger VMT Reductions (miles)	65,975,399
Fossil Fuel Use Reductions (gallons)	1,840,076
Fossil Fuel Energy Use Reductions (kWh)	
Energy and Fuel Cost Savings (\$)	\$72,439,197
Passenger Travel Cost Savings (\$)	(\$20,077,369)
ROG Emission Reductions (lbs)	(3,252)
NO _x Emission Reductions (lbs)	(97,137)
PM _{2.5} Emission Reductions (lbs)	2,150
Diesel PM Emission Reductions (lbs)	(654)
TIRCP	
Passenger VMT Reductions (miles)	59,569,663
Fossil Fuel Use Reductions (gallons)	1,589,157
Fossil Fuel Energy Use Reductions (kWh)	
Energy and Fuel Cost Savings (\$)	\$62,561,125
Passenger Travel Cost Savings (\$)	(\$17,339,546)
ROG Emission Reductions (lbs)	(2,809)
NO _x Emission Reductions (lbs)	(83,891)
PM _{2.5} Emission Reductions (lbs)	1,857
Diesel PM Emission Reductions (lbs)	(565)
Additional CCI Program 1	
Passenger VMT Reductions (miles)	9,405,736
Fossil Fuel Use Reductions (gallons)	250,919
Fossil Fuel Energy Use Reductions (kWh)	
Energy and Fuel Cost Savings (\$)	\$9,878,072
Passenger Travel Cost Savings (\$)	(\$2,737,823)
ROG Emission Reductions (lbs)	(444)
NO _x Emission Reductions (lbs)	(13,246)
PM _{2.5} Emission Reductions (lbs)	293
Diesel PM Emission Reductions (lbs)	(89)

Example Project #2

Overview of the proposed project

The lead agency plans to expand and replace part of the existing fleet that provides a weekday local metropolitan bus service by purchasing ten new all-electric buses and ten new fuel cell electric buses, which are projected to operate for twelve years. The project will also install an integrated ticketing system in low-income communities to increase ridership. The proposed project consists of “Cleaner Vehicles/Technology/Fuels” and “System and Efficiency Improvements” with the following features:

- Operates predominantly within Los Angeles County
- Replace 10 transit buses
 - First Year (Yr1) of operation: 2022
 - Final Year (YrF) of operation: 2034
 - New Vehicle Type: 2022 electric Transit Bus
 - Annual VMT: 23,560 mi/yr are estimated to be driven per new vehicle
 - Replaced vehicles: 2010 diesel Transit Bus
- Replace another 10 transit buses
 - First Year (Yr1) of operation: 2024
 - Final Year (YrF) of operation: 2036
 - New Vehicle Type: 2022 fuel cell Transit Bus
 - Annual VMT: 23,560 mi/yr are estimated to be driven per new vehicle
 - Replaced vehicles: 2015 diesel Transit Bus
- Integrated ticketing
 - First Year (Yr1) of integrated ticketing supported: 2020
 - Final Year (YrF) of integrated ticketing supported: 2023
- TIRCP funds requested: \$7,000,000
- Total TIRCP funds requested: \$7,000,000
- Additional GGRF Funds: \$1,200,000 from HVIP as cost share for electric buses
- Additional GGRF Funds: \$500,000 from AHSC as cost share hydrogen buses
- Additional GGRF Funds: \$3,000,000 from HVIP as cost share for hydrogen buses
- Non-GGRF Leveraged Funds: \$200,000

Methods to apply

Step 1: Enter Basic Project Information

Review the Read Me tab and User Guide before beginning.

Enter the relevant information about the project into the “Project Info” tab.

General Information (Project Info Tab)	
•	Project Name: Electric Transit Bus Expansion Project
•	Lead Agency Name: Los Angeles Transit
•	Contact Name: Bob Smith
•	Contact Phone Number: (626) 123-4567
•	Contact Email: bob.smith@latransit.org
•	Date Calculator Completed: 1/21/2019
•	TIRCP GGRF Funds Requested: \$7,000,000
•	Total TIRCP GGRF Funds: \$7,000,000
•	Total GGRF Funds: \$7,800,000
•	Non-GGRF Leveraged Funds: \$200,000

Once the data has been entered, the “Project Info” tab should appear as follows:

Information	Inputs
Project Name:	Electric Transit Bus Expansion Project
Lead Agency Name:	Los Angeles Transit
Contact Name:	Bob Smith
Contact Phone Number:	(626) 123-4567
Contact Email:	bob.smith@latransit.org
Date Calculator Completed:	1/21/2019
TIRCP GGRF Funds Requested (\$):	\$ 7,000,000
Total TIRCP GGRF Funds (\$):	\$ 7,000,000
Total GGRF Funds (\$):	\$ 11,700,000
Non-GGRF Leveraged Funds (\$):	\$ 300,000
Total Funds (\$):	\$ 12,000,000

The next steps entail filling out the **Quantifiable Component #** tabs. Because there are two project components, the applicant will fill out two of these tabs.

Step 2: Identify the Project Subcomponent and Select the Applicable Project Type

The project consists of two components: two “Cleaner Vehicles/Technology/Fuels” project type subcomponents and a “System and Efficiency Improvements” project type component.

Step 3: Enter Project Subcomponent-Specific Information

First, the applicant should enter the project information for their first project component (“Cleaner Vehicles/Technology/Fuels”) into the TIRCP Calculator Tool **Quantifiable Component 1** tab to estimate GHG emission reductions and other benefits.

Calculator Inputs (Quantifiable Component 1 Tab)	
Subcomponent 1	Subcomponent 2
<p>Funding Inputs:</p> <ul style="list-style-type: none"> Identifying Descriptor (ID): Transit Bus Replacement 1 TIRCP Funds Requested (\$): \$3,000,000 Total Project Cost (\$): \$11,000,000 CCI Program: CARB - Clean Truck & Bus Additional GGRF Funds (\$): \$1,200,000 CCI Program: Additional GGRF Funds (\$): <p>Project Info Inputs:</p> <ul style="list-style-type: none"> Project Type: Cleaner Vehicles/Technology/Fuels Service Type: Local/ Intercity Bus (Short Distances) Type of Region: County Region: Los Angeles Year 1 (Yr1): 2022 Year F (YrF): 2034 <p>New Service Vehicle Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Transit Bus Fuel Type: Electric Hybrid Vehicle: N/A Model Year: 2022 Annual VMT: 230,560 <p>Baseline Vehicle Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Transit Bus Fuel Type: Diesel Model Year: 2010 Annual VMT: 230,056 	<p>Funding Inputs:</p> <ul style="list-style-type: none"> Identifying Descriptor (ID): Transit Bus Replacement 2 TIRCP Funds Requested (\$): \$2,600,000 Total Project Cost (\$): \$20,000,000 CCI Program: CARB - Clean Truck & Bus Additional GGRF Funds (\$): \$3,000,000 CCI Program: SGC - AHSC Additional GGRF Funds (\$): \$500,000 <p>Project Info Inputs:</p> <ul style="list-style-type: none"> Project Type: Cleaner Vehicles/Technology/Fuels Service Type: Local/ Intercity Bus (Short Distances) Type of Region: County Region: Los Angeles Year 1 (Yr1): 2024 Year F (YrF): 2036 <p>New Service Vehicle Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Transit Bus Fuel Type: Hydrogen Fuel Cell Hybrid Vehicle: N/A Model Year: 2024 Annual VMT: 230,560 <p>Baseline Vehicle Inputs:</p> <ul style="list-style-type: none"> Vehicle Type: Transit Bus Fuel Type: Diesel Model Year: 2015 Annual VMT: 230,056

Once the data has been entered, the **Quantifiable Component 1** tab should look like the following:

Input	Description	Quantified Component 1: Subcomponent 1	Quantified Component 1: Subcomponent 2
Identifying Descriptor (ID)	Brief description of the quantifiable component identifying it from other separable components.	Transit Bus Replacement 1	Transit Bus Replacement 2
Funding Inputs			
TIRCP Funds Requested (\$)	Total TIRCP funds requested for this separable component.	\$3,000,000	\$2,600,000
Total Project Cost (\$)	Total cost of this separable component.	\$11,000,000	\$20,000,000
Additional CCI Program 1, if applicable			
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.	CARB - Clean Truck & Bus	CARB - Clean Truck & Bus
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 1.	\$1,200,000	\$3,000,000
Additional CCI Program 2, if applicable			
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.		SGC - AHSC
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 2.		\$500,000
Total GGRF Funds Requested (\$)	Total GGRF funds requested from all CCI Programs	\$4,200,000	\$6,100,000
Project Info Inputs		Input	Input
Project Type	For the purposes of this quantification, eligible TIRCP projects fall into four project types. Select the project type that best describes this component.	Cleaner Vehicles / Technology / Fuels	Cleaner Vehicles / Technology / Fuels
Service Type	The transit service (e.g., Intercity/Express Bus (Long Distance), Light Rail, Vanpool, etc.) directly associated with the proposed project. For projects that serve multiple services, select Multi-modal.	Local/ Intercity Bus (Short Distances)	Local/ Intercity Bus (Short Distances)
Type of Region	The type of region that best encompasses the geographic location for the proposed project type.	County	County
Region	The County or Air Basin where the majority of the service occurs.	Los Angeles	Los Angeles
Year 1 (Yr1)	The first year of service or the first year the facility or rolling stock will be in use.	2022	2024
Year F (YrF)	The final year of service or the final year the facility or rolling stock's useful life.	2034	2036
Useful Life (yrs)	The number of years the service is funded or the useful life of the facility or rolling stock. Limited to up to 50 years.	12	12

Displaced Passenger Auto VMT Inputs		Input	Documentation	Input	Documentation
Yr1 Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the first year (Yr1).				
YrF Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the final year. If the ridership is not expected to change, Yr1 and YrF should be the same value.				
Adjustment Factor	Discount factor applied to annual ridership to account for transit-dependent riders. <u>Use:</u> Document project-specific data or system average developed from a recent, statistically valid survey or default.				
Length of Average Trip (mi)	Annual passenger miles over unlinked trips directly associated with the proposed project.				
New Service Vehicle Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) that will operate the new service or will be procured.	Transit Bus		Transit Bus	
Engine Tier	The engine tier for the vehicle(s) that will operate the new service.				
Engine Horsepower	The engine horsepower rating for the vehicle(s) that will operate the new service.				
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the vehicle for the new service, or of the new vehicle(s) to be procured.	Electric		Hydrogen Fuel Cell	
Hybrid Vehicle	Is the vehicle for the new service, or vehicle(s) to be procured, a hybrid?	N/A		N/A	
Model Year	The engine model year of the vehicle that will operate the new service, or of the new vehicle(s) to be procured.	2022		2024	
Project-Specific GHG Emission Factor (gCO _{2e} /MJ)	If used, applicant must be able to demonstrate an approved carbon intensity value under the Low Carbon Fuel Standard and submit additional documentation.				
Annual VMT (mi/yr)	The estimated annual VMT required to operate the new service or of the new vehicle(s) to be procured (e.g., 72,000). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.	230,560	10 vehicles * 11 mi/trip * 8 trips/day * 262 days/yr based on transit data	230,560	10 vehicles * 11 mi/trip * 8 trips/day * 262 days/yr based on transit data
Annual Fuel	The estimated annual fuel (i.e., gallon of diesel, kWh of electricity) required to operate the new service, or of the new rail or ferry vehicle(s) to be procured (e.g., 26,000). Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.				

Baseline Vehicle Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the baseline vehicle(s).	Transit Bus		Transit Bus	
Engine Tier	The engine tier of the baseline vehicle(s).				
Engine Horsepower	The engine horsepower rating of the baseline vehicle(s).				
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the baseline vehicle(s).	Diesel		Diesel	
Model Year	The average engine model year(s) of the baseline vehicle(s).	2010		2015	
Annual VMT (mi/yr)	The estimated annual VMT of the baseline vehicle(s). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.	230,560	10 vehicles * 11 mi/trip * 8 trips/day * 262 days/yr based on transit data	230,560	10 vehicles * 11 mi/trip * 8 trips/day * 262 days/yr based on transit data
Annual Fuel	The estimated annual fuel the baseline vehicle(s) would have required to operate the equivalent as the new vehicle to be procured. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.				
Fuel/Energy Reductions Inputs		Input	Documentation	Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the displaced vehicle(s).				
Engine Tier	The engine tier of the displaced vehicle(s).				
Engine Horsepower	The engine horsepower rating of the displaced vehicle(s).				
Fuel Type	The fuel/energy type (e.g., diesel, grid electricity, etc.) being reduced as a result of the project.				
Model Year	The average engine model year(s) of the vehicle(s) to realize fuel/energy reductions as a result of the project.				
Annual Fuel	The estimated annual fuel/energy reductions expected to be realized as a result of the project. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.				

Travel Cost Savings Inputs		Input	Documentation	Input	Documentation
Baseline Average One-Way Fare Cost (\$/Trip/Rider)	The average fare cost per trip per rider prior to project implementation. If expanding service, baseline fare cost is zero.				
New Average One-way Fare Cost (\$/Trip/Rider)	The new expected average fare cost per trip per rider resulting from the proposed project.				
Average Transit Facility Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would pay at the transit facility where the trip originates. Consider that not all transit riders may use the parking. However, the calculations will already take into account that parking is only paid once per round trip.				
Average Avoided Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that parking is only paid once per round trip.				
Average Avoided Toll Cost (\$/Trip/Rider)	The average expected cost of tolls per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that tolls are only paid once per round trip.				

Once all project component 1 inputs are complete, the applicant should fill in the inputs for the second project type (“System and Efficiency Improvements”) on the **Quantifiable Component 2** tab, as follows:

Calculator Inputs (Quantifiable Component 2 Tab)
Subcomponent 1
<p>Funding Inputs:</p> <ul style="list-style-type: none"> Identifying Descriptor (ID): Integrated Ticketing System TIRCP Funds Requested (\$): \$1,400,000 Total Project Cost (\$): \$2,000,000 CCI Program: Additional GGRF Funds (\$): CCI Program: Additional GGRF Funds (\$): <p>Project Info Inputs:</p> <ul style="list-style-type: none"> Project Type: System and Efficiency Improvements Service Type: Local/ Intercity Bus (Short Distances) Type of Region: County Region: Los Angeles Year 1 (Yr1): 2020 Year F (YrF): 2023 <p>Displaced Passenger Auto VMT Inputs:</p> <ul style="list-style-type: none"> Yr1 Ridership: 150,000 YrF Ridership: 160,000 Adjustment Factor (A): 0.50 (default) Length of Average Trip (L, miles): 11 <p>Travel Cost Savings Inputs</p> <ul style="list-style-type: none"> Baseline Average One-Way Fare Cost: \$2.50 New Average One-Way Fare Cost: \$0.00 Average Transit Facility Parking Cost: \$3.00 Average Avoided Parking Cost: \$18.00 Average Avoided Toll Cost: \$3.00

Once the data has been entered, the **Quantifiable Component 2** tab should look like the following:

Input	Description	Quantified Component 1: Subcomponent 2
Identifying Descriptor (ID)	Brief description of the quantifiable component identifying it from other separable components.	Integrated Ticketing System
Funding Inputs		
TIRCP Funds Requested (\$)	Total TIRCP funds requested for this separable component.	\$1,400,000
Total Project Cost (\$)	Total cost of this separable component.	\$2,000,000
Additional CCI Program 1, if applicable		
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.	
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 1.	
Additional CCI Program 2, if applicable		
CCI Program	Other CCI Program from which project has or will be requesting GGRF funds.	
Additional GGRF Funds (\$)	Total GGRF funds requested or to be requested from Additional CCI Program 2.	
Total GGRF Funds Requested (\$)	Total GGRF funds requested from all CCI Programs	\$1,400,000
Project Info Inputs		Input
Project Type	For the purposes of this quantification, eligible TIRCP projects fall into four project types. Select the project type that best describes this component.	System and Efficiency Improvements
Service Type	The transit service (e.g., Intercity/Express Bus (Long Distance), Light Rail, Vanpool, etc.) directly associated with the proposed project. For projects that serve multiple services, select Multi-modal.	Local/ Intercity Bus (Short Distances)
Type of Region	The type of region that best encompasses the geographic location for the proposed project type.	County
Region	The County or Air Basin where the majority of the service occurs.	Los Angeles
Year 1 (Yr1)	The first year of service or the first year the facility or rolling stock will be in use.	2020
Year F (YrF)	The final year of service or the final year the facility or rolling stock's useful life.	2023
Useful Life (yrs)	The number of years the service is funded or the useful life of the facility or rolling stock. Limited to up to 50 years.	3

Displaced Passenger Auto VMT Inputs		Input	Documentation
Yr1 Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the first year (Yr1).	150,000	0.75% increase based on transit agency data
YrF Ridership	The increase in unlinked passenger trips directly associated with the proposed project in the final year. If the ridership is not expected to change, Yr1 and YrF should be the same value.	160,000	0.8% increase based on transit agency data
Adjustment Factor	Discount factor applied to annual ridership to account for transit-dependent riders. <u>Use:</u> Document project-specific data or system average developed from a recent, statistically valid survey or default.	0.50	Default for agency-specific local bus service
Length of Average Trip (mi)	Annual passenger miles over unlinked trips directly associated with the proposed project.	11.00	Based on transit agency data
New Service Vehicle Inputs		Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) that will operate the new service or will be procured.		
Engine Tier	The engine tier for the vehicle(s) that will operate the new service.		
Engine Horsepower	The engine horsepower rating for the vehicle(s) that will operate the new service.		
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the vehicle for the new service, or of the new vehicle(s) to be procured.		
Hybrid Vehicle	Is the vehicle for the new service, or vehicle(s) to be procured, a hybrid?		
Model Year	The engine model year of the vehicle that will operate the new service, or of the new vehicle(s) to be procured.		
Project-Specific GHG Emission Factor (gCO ₂ e/MJ)	If used, applicant must be able to demonstrate an approved carbon intensity value under the Low Carbon Fuel Standard and submit additional documentation.		
Annual VMT (mi/yr)	The estimated annual VMT required to operate the new service or of the new vehicle(s) to be procured (e.g., 72,000). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.		
Annual Fuel	The estimated annual fuel (i.e., gallon of diesel, kWh of electricity) required to operate the new service, or of the new rail or ferry vehicle(s) to be procured (e.g., 26,000). Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.		

Baseline Vehicle Inputs		Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the baseline vehicle(s).		
Engine Tier	The engine tier of the baseline vehicle(s).		
Engine Horsepower	The engine horsepower rating of the baseline vehicle(s).		
Fuel Type	The fuel type (e.g., electric, diesel, etc.) of the baseline vehicle(s).		
Model Year	The average engine model year(s) of the baseline vehicle(s).		
Annual VMT (mi/yr)	The estimated annual VMT of the baseline vehicle(s). For rail and ferry vehicles, applicants may alternatively use Annual Fuel. For vehicles with multiple engines (e.g., DMUs), provide the cumulative VMT across all the engines.		
Annual Fuel	The estimated annual fuel the baseline vehicle(s) would have required to operate the equivalent as the new vehicle to be procured. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.		
Fuel/Energy Reductions Inputs		Input	Documentation
Vehicle Type	The vehicle type (e.g., Transit Bus, Streetcar, Ferry, etc.) of the displaced vehicle(s).		
Engine Tier	The engine tier of the displaced vehicle(s).		
Engine Horsepower	The engine horsepower rating of the displaced vehicle(s).		
Fuel Type	The fuel/energy type (e.g., diesel, grid electricity, etc.) being reduced as a result of the project.		
Model Year	The average engine model year(s) of the vehicle(s) to realize fuel/energy reductions as a result of the project.		
Annual Fuel	The estimated annual fuel/energy reductions expected to be realized as a result of the project. Units of gallons for biodiesel, diesel, gasoline, LNG, renewable diesel; scf for CNG and renewable natural gas; kWh for electric; kg for hydrogen.		

Travel Cost Savings Inputs		Input	Documentation
Baseline Average One-Way Fare Cost (\$/Trip/Rider)	The average fare cost per trip per rider prior to project implementation. If expanding service, baseline fare cost is zero.	\$2.50	Current fare cost
New Average One-Way Fare Cost (\$/Trip/Rider)	The new expected average fare cost per trip per rider resulting from the proposed project.	\$2.00	Expected fare cost
Average Transit Facility Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would pay at the transit facility where the trip originates. Consider that not all transit riders may use the parking. However, the calculations will already take into account that parking is only paid once per round trip.	\$3.00	Current average parking rate
Average Avoided Parking Cost (\$/Trip/Rider)	The average expected cost of parking per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that parking is only paid once per round trip.	\$4.50	Average cost in downtown LA (\$18), and assuming only a quarter of riders pay for parking
Average Avoided Toll Cost (\$/Trip/Rider)	The average expected cost of tolls per trip per rider that riders would have otherwise paid if not using the service resulting from the project. The calculations will already take into account that tolls are only paid once per round trip.	\$3.00	Cost for toll road through service route

Once all project component and subcomponent inputs are complete, follow Step 4.

Step 4: Review the Estimated Benefits for the Proposed Project

The **GHG Summary** tab displays the Total GHG Emission Reductions per Total TIRCP GGRF Funds and per Total GGRF Funds. GHG emission reductions are prorated according to the level of program funding contributed from TIRCP and other California Climate Investments programs, as applicable.

	Quantified GHG Component 1	Quantified GHG Component 2	Total Project
Identifying Descriptor	Transit Bus Replacement 1; Transit Bus Replacement 2	Integrated Ticketing System	
GHG Emission Reduction Start Date (Year)	2022; 2024	2020	
Total CCI			
Total GHG Emission Reductions (MTCO _{2e})	7,910	1,111	9,021
Total GGRF Funds Requested (\$)	\$10,300,000	\$1,400,000	\$11,700,000
Total GHG Emission Reductions/Total GGRF Funds Requested (MTCO _{2e} /\$)	0.000768	0.000794	0.000771
TIRCP			
TIRCP GHG Emission Reductions (MTCO _{2e})	4,301	1,111	5,412
TIRCP Funds Requested (\$)	\$5,600,000	\$1,400,000	\$7,000,000
TIRCP GHG Emission Reductions/TIRCP Funds Requested (MTCO _{2e} /\$)	0.000768	0.000794	0.000773
TIRCP Funds Requested/TIRCP GHG Emission Reductions (\$/MTCO _{2e})	1,302	1,260	1,293
Additional CCI Program 1			
CCI Program	CARB – Clean Truck & Bus		
GHG Emission Reductions Attributable to other GGRF Programs (MTCO _{2e})	3,225		
Total Additional GGRF Funds to Implement Project (\$)	\$4,200,000		
Additional CCI Program 2			
CCI Program	SGC – AHSC		
GHG Emission Reductions Attributable to other GGRF Programs (MTCO _{2e})	384		
Total Additional GGRF Funds to Implement Project (\$)	\$500,000		

The **Co-benefits Summary** tab displays the key variables and air pollutant emission estimates from the project. Key variables and air pollutant emission estimates are also prorated according to the level of program funding contributed from TIRCP and other California Climate Investments programs, as applicable.

	Quantified Co-Benefit Component 1	Quantified Co-Benefit Component 2	Total Project
Identifying Descriptor	Transit Bus Replacement 1; Transit Bus Replacement 2	Integrated Ticketing System	
	Total CCI		
Passenger VMT Reductions (miles)		2,557,500	2,557,500
Fossil Fuel Use Reductions (gallons)	858,258	103,552	961,810
Fossil Fuel Energy Use Reductions (kWh)	(2,654,819)		(2,654,819)
Energy and Fuel Cost Savings (\$)	(\$681,582)		(\$681,582)
Passenger Travel Cost Savings (\$)		\$2,180,850	\$2,180,850
ROG Emission Reductions (lbs)	13	111	125
NO _x Emission Reductions (lbs)	9,628	407	10,035
PM _{2.5} Emission Reductions (lbs)	224	111	335
Diesel PM Emission Reductions (lbs)	71	0	72
	TIRCP		
Passenger VMT Reductions (miles)		2,557,500	2,557,500
Fossil Fuel Use Reductions (gallons)	466,625	103,552	570,178
Fossil Fuel Energy Use Reductions (kWh)	(1,443,397)		(1,443,397)
Energy and Fuel Cost Savings (\$)	(\$370,569)		(\$370,569)
Passenger Travel Cost Savings (\$)		\$2,180,850	\$2,180,850
ROG Emission Reductions (lbs)	7	111	119
NO _x Emission Reductions (lbs)	5,234	407	5,642
PM _{2.5} Emission Reductions (lbs)	122	111	233
Diesel PM Emission Reductions (lbs)	39	0	39

	Quantified Co-Benefit Component 1	Quantified Co-Benefit Component 2	Total Project
Additional CCI Program 1			
Passenger VMT Reductions (miles)			
Fossil Fuel Use Reductions (gallons)	349,969		349,969
Fossil Fuel Energy Use Reductions (kWh)	(1,082,548)		(1,082,548)
Energy and Fuel Cost Savings (\$)	(\$277,927)		(\$277,927)
Passenger Travel Cost Savings (\$)			
ROG Emission Reductions (lbs)	5		5
NO _x Emission Reductions (lbs)	3,926		3,926
PM _{2.5} Emission Reductions (lbs)	91		91
Diesel PM Emission Reductions (lbs)	29		29
Additional CCI Program 2			
Passenger VMT Reductions (miles)			
Fossil Fuel Use Reductions (gallons)	41,663		41,663
Fossil Fuel Energy Use Reductions (kWh)	(128,875)		(128,875)
Energy and Fuel Cost Savings (\$)	(\$33,087)		(\$33,087)
Passenger Travel Cost Savings (\$)			
ROG Emission Reductions (lbs)	1		1
NO _x Emission Reductions (lbs)	467		467
PM _{2.5} Emission Reductions (lbs)	11		11
Diesel PM Emission Reductions (lbs)	3		3

Appendix A. Default Lookup Tables

CARB staff developed these recommended values for applicants to use for the length of the average unlinked passenger trip and baseline average fare cost, by agency or statewide, by mode, and by type of service using 2017 Annual data from the National Transit Database⁶. These values were calculated by dividing passenger miles traveled by unlinked passenger trips. Adjustment factors were developed by the Institute of Transportation Studies based on a review of research on transit dependency and data from the 2013 California Household Travel Survey⁷.

Table A-1. Length of Average Trip and Adjustment Factor by Mode

Mode Type	Mode	Type of Service	Length of Average Trip (Miles/Trip)	Adjustment Factor
Commuter Bus (Express/Intercity)	CB	DO	17.57	70.5
		PT	21.83	
Cable Car	CC	DO	1.26	47.9
Commuter Rail	CR	PT	25.69	86.7
Demand Response	DR	DO	9.08	54.0
		PT	9.94	
Demand Response Taxi	DT	PT	12.35	54.0
Ferryboat	FB	DO	10.85	100
		PT	15.01	
Heavy Rail	HR	DO	11.48	79.4
Light Rail	LR	DO	5.44	68.5
Bus (Local)	MB	DO	3.77	56.1 (Transit Bus) 58.5 (Shuttle)
		PT	4.27	
Monorail/Automated Guideway	MG	PT	3.18	47.9
Bus Rapid Transit	RB	DO	6.56	54.2
Streetcar Rail	SR	DO	1.43	47.9
Trolley Bus	TB	DO	1.48	47.9
Vanpool	VP	DO	42.28	87.9
		PT	44.27	
Hybrid Rail	YR	PT	8.58	73.8

⁶ Federal Transit Administration. National Transit Database. Available at <https://www.transit.dot.gov/ntd>.

⁷ Handy, Susan, Elisa Barbour, Alissa Kendall, Jamey Volker (2019) Updated Default Values for Transit Dependency and Average Length of Unlinked Transit Passenger Trips, for Calculations Using TAC Methods for California Climate Investments Programs. Institute of Transportation Studies, University of California, Davis.

https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/transit_factors_technical_081319.pdf

Table A-2. Length of Average Trip and Average Fare Cost by Transit Agency

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
Access Services	DR	PT	11.47	\$2.22
Access Services	DT	PT	14.69	\$2.39
Alameda-Contra Costa Transit District	CB	DO	14.19	\$2.49
Alameda-Contra Costa Transit District	DR	PT	10.47	\$3.81
Alameda-Contra Costa Transit District	MB	DO	3.28	\$1.36
Alameda-Contra Costa Transit District	MB	PT	13.03	\$2.48
Altamont Corridor Express	CR	PT	42.86	\$6.85
Anaheim Transportation Network	MB	PT	1.98	\$0.55
Antelope Valley Transit Authority	CB	PT	42.05	\$8.53
Antelope Valley Transit Authority	DR	PT	9.18	\$2.21
Antelope Valley Transit Authority	MB	PT	7.15	\$1.13
Butte County Association of Governments	DR	PT	4.33	\$2.09
Butte County Association of Governments	MB	PT	4.92	\$1.11
California Vanpool Authority	VP	DO	42.28	\$3.27
Central Contra Costa Transit Authority	DR	PT	9.89	\$3.55
Central Contra Costa Transit Authority	MB	DO	4.54	\$1.12
City of Commerce Municipal Buslines	DR	DO	9.36	\$0.00
City of Commerce Municipal Buslines	MB	DO	4.03	\$0.00
City of Elk Grove	CB	PT	13.46	\$1.80
City of Elk Grove	DR	PT	6.27	\$5.17
City of Elk Grove	MB	PT	4.00	\$1.34
City of Fairfield - Fairfield and Suisun Transit	CB	PT	20.40	\$3.88
City of Fairfield - Fairfield and Suisun Transit	DR	PT	9.63	\$4.94
City of Fairfield - Fairfield and Suisun Transit	MB	PT	3.17	\$1.03
City of Gardena Transportation Department	DR	DO	3.17	\$0.50
City of Gardena Transportation Department	MB	DO	3.20	\$0.77
City of Glendale	DR	PT	5.26	\$1.09
City of Glendale	MB	PT	2.20	\$0.62
City of La Mirada Transit	DR	PT	2.86	\$0.77
City of Los Angeles Department of Transportation	CB	PT	17.00	\$3.03
City of Los Angeles Department of Transportation	DR	PT	4.69	\$0.92

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
City of Los Angeles Department of Transportation	DT	PT	2.18	\$2.77
City of Los Angeles Department of Transportation	MB	PT	1.55	\$0.37
City of Petaluma	DR	PT	3.90	\$2.23
City of Petaluma	MB	PT	2.76	\$0.64
City of Redondo Beach - Beach Cities Transit	DR	PT	4.43	\$0.85
City of Redondo Beach - Beach Cities Transit	MB	PT	4.10	\$0.84
City of Riverside Special Transportation	DR	DO	7.79	\$2.11
City of San Luis Obispo	MB	PT	3.10	\$0.62
City of Santa Rosa	DR	PT	5.46	\$3.13
City of Santa Rosa	MB	DO	3.94	\$0.77
City of Santa Rosa	MB	PT	3.00	\$10.28
City of Tulare	DR	PT	5.38	\$2.27
City of Tulare	MB	PT	4.36	\$0.84
City of Turlock	DR	PT	7.42	\$3.01
City of Turlock	MB	PT	3.33	\$0.56
City of Visalia - Visalia City Coach	CB	PT	45.01	\$7.69
City of Visalia - Visalia City Coach	DR	PT	7.69	\$3.93
City of Visalia - Visalia City Coach	MB	PT	6.26	\$0.90
Culver City Municipal Bus Lines	DR	DO	2.03	\$0.45
Culver City Municipal Bus Lines	MB	DO	3.33	\$0.63
El Dorado County Transit Authority	CB	DO	31.03	\$5.37
El Dorado County Transit Authority	DR	DO	11.22	\$10.25
El Dorado County Transit Authority	MB	DO	8.97	\$1.47
Foothill Transit	MB	PT	7.62	\$1.19
Fresno Area Express	DR	PT	7.30	\$1.30
Fresno Area Express	MB	DO	2.60	\$0.79
Gold Coast Transit	DR	PT	7.45	\$2.62
Gold Coast Transit	MB	DO	4.25	\$0.81
Golden Empire Transit District	DR	DO	6.48	\$2.69
Golden Empire Transit District	MB	DO	3.59	\$0.84
Golden Gate Bridge, Highway and Transportation District	DR	PT	11.82	\$4.09
Golden Gate Bridge, Highway and Transportation District	FB	DO	10.85	\$8.05
Golden Gate Bridge, Highway and Transportation District	MB	DO	18.65	\$4.79

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
Imperial County Transportation Commission	DR	PT	18.47	\$2.09
Imperial County Transportation Commission	MB	PT	9.91	\$0.83
Kings County Area Public Transit Agency	DR	PT	3.75	\$1.92
Kings County Area Public Transit Agency	MB	PT	6.46	\$0.73
Laguna Beach Municipal Transit	MB	DO	2.22	\$0.04
Livermore / Amador Valley Transit Authority	DR	PT	6.02	\$4.14
Livermore / Amador Valley Transit Authority	MB	PT	4.62	\$1.22
Long Beach Transit	DR	PT	4.76	\$1.66
Long Beach Transit	MB	DO	3.23	\$0.61
Los Angeles County Metropolitan Transportation Authority dba: Metro	HR	DO	5.00	\$0.78
Los Angeles County Metropolitan Transportation Authority dba: Metro	LR	DO	7.31	\$0.78
Los Angeles County Metropolitan Transportation Authority dba: Metro	MB	DO	4.03	\$0.82
Los Angeles County Metropolitan Transportation Authority dba: Metro	MB	PT	4.72	\$0.43
Los Angeles County Metropolitan Transportation Authority dba: Metro	RB	DO	6.56	\$0.78
Los Angeles County Metropolitan Transportation Authority dba: Metro	VP	PT	44.79	\$3.93
Marin County Transit District	DR	PT	8.10	\$3.33
Marin County Transit District	MB	PT	4.09	\$1.08
Modesto Area Express	DR	PT	6.84	\$2.87
Modesto Area Express	DT	PT	4.90	\$1.69
Modesto Area Express	MB	PT	4.26	\$0.89
Montebello Bus Lines	DT	PT	2.16	\$0.29
Montebello Bus Lines	MB	DO	3.25	\$0.76
Montebello Bus Lines	MB	PT	2.90	\$1.20
Monterey-Salinas Transit	CB	DO	40.49	\$16.91
Monterey-Salinas Transit	DR	PT	8.58	\$2.59
Monterey-Salinas Transit	MB	DO	6.21	\$2.14
Monterey-Salinas Transit	MB	PT	3.71	\$1.92
Napa Valley Transportation Authority	CB	PT	30.84	\$2.33
Napa Valley Transportation Authority	DR	PT	7.19	\$2.43
Napa Valley Transportation Authority	MB	PT	7.42	\$0.69

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
North County Transit District	CR	PT	26.44	\$4.04
North County Transit District	DR	PT	12.97	\$3.83
North County Transit District	MB	PT	4.32	\$0.95
North County Transit District	YR	PT	8.58	\$1.06
Norwalk Transit System	DR	PT	3.41	\$1.14
Norwalk Transit System	MB	DO	4.19	\$0.88
Omnitrans	DR	PT	14.01	\$3.78
Omnitrans	MB	DO	5.14	\$1.01
Omnitrans	MB	PT	3.12	\$1.08
Orange County Transportation Authority	CB	DO	21.11	\$1.68
Orange County Transportation Authority	CB	PT	19.28	\$1.44
Orange County Transportation Authority	DR	PT	11.29	\$4.42
Orange County Transportation Authority	DT	PT	3.02	\$3.44
Orange County Transportation Authority	MB	DO	3.35	\$0.99
Orange County Transportation Authority	MB	PT	3.88	\$0.97
Orange County Transportation Authority	VP	PT	34.51	\$3.95
Paratransit, Inc.	DR	DO	9.74	\$4.20
Paratransit, Inc.	DR	PT	10.46	\$7.07
Paratransit, Inc.	DT	PT	8.37	\$4.47
Peninsula Corridor Joint Powers Board dba: Caltrain	CR	PT	21.77	\$4.96
Peninsula Corridor Joint Powers Board dba: Caltrain	MB	PT	3.47	\$0.00
Placer County Department of Public Works and Facilities	CB	PT	20.11	\$5.37
Placer County Department of Public Works and Facilities	DR	DO	11.84	\$3.53
Placer County Department of Public Works and Facilities	DR	PT	3.41	\$0.73
Placer County Department of Public Works and Facilities	DT	PT	15.71	\$3.54
Placer County Department of Public Works and Facilities	MB	DO	7.64	\$1.05
Placer County Department of Public Works and Facilities	MB	PT	3.09	\$0.67
Placer County Department of Public Works and Facilities	VP	PT	33.94	\$2.79
Pomona Valley Transportation Authority	DR	PT	5.50	\$0.81
Pomona Valley Transportation Authority	DT	PT	4.81	\$1.94
Redding Area Bus Authority	DR	PT	8.86	\$3.26

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
Redding Area Bus Authority	MB	PT	6.99	\$1.02
Riverside Transit Agency	CB	DO	19.49	\$3.83
Riverside Transit Agency	CB	PT	23.22	\$2.08
Riverside Transit Agency	DR	PT	11.28	\$3.68
Riverside Transit Agency	DT	PT	17.51	\$4.05
Riverside Transit Agency	MB	DO	6.27	\$0.90
Riverside Transit Agency	MB	PT	6.64	\$1.33
Sacramento Regional Transit District	DR	DO	2.59	\$1.38
Sacramento Regional Transit District	LR	DO	6.01	\$1.29
Sacramento Regional Transit District	MB	DO	3.46	\$1.53
San Diego Association of Governments	VP	PT	48.70	\$3.11
San Diego Metropolitan Transit System	CB	PT	24.51	\$4.17
San Diego Metropolitan Transit System	DR	PT	10.38	\$4.52
San Diego Metropolitan Transit System	LR	DO	5.61	\$1.04
San Diego Metropolitan Transit System	MB	DO	4.51	\$1.02
San Diego Metropolitan Transit System	MB	PT	3.25	\$1.00
San Francisco Bay Area Rapid Transit District	HR	DO	13.72	\$3.64
San Francisco Bay Area Rapid Transit District	MG	PT	3.18	\$5.58
San Francisco Bay Area Water Emergency Transportation Authority	FB	PT	15.01	\$7.07
San Francisco Municipal Railway	CC	DO	1.26	\$4.34
San Francisco Municipal Railway	DR	PT	6.17	\$2.29
San Francisco Municipal Railway	LR	DO	2.73	\$0.77
San Francisco Municipal Railway	MB	DO	2.15	\$0.77
San Francisco Municipal Railway	SR	DO	1.43	\$0.77
San Francisco Municipal Railway	TB	DO	1.48	\$0.77
San Joaquin Regional Transit District	CB	PT	44.30	\$4.45
San Joaquin Regional Transit District	DT	PT	5.83	\$3.73
San Joaquin Regional Transit District	MB	DO	3.53	\$0.82
San Joaquin Regional Transit District	MB	PT	4.56	\$0.82
San Luis Obispo Regional Transit Authority	DR	DO	7.85	\$3.05
San Luis Obispo Regional Transit Authority	MB	DO	11.05	\$1.31
San Mateo County Transit District	DR	PT	8.10	\$2.51
San Mateo County Transit District	DT	PT	11.89	\$2.38
San Mateo County Transit District	MB	DO	3.61	\$1.32
San Mateo County Transit District	MB	PT	6.19	\$1.34
Santa Barbara Metropolitan Transit District	MB	DO	4.09	\$1.12

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
Santa Clara Valley Transportation Authority	DR	PT	10.24	\$3.45
Santa Clara Valley Transportation Authority	DT	PT	10.68	\$2.86
Santa Clara Valley Transportation Authority	LR	DO	5.25	\$0.88
Santa Clara Valley Transportation Authority	MB	DO	5.18	\$0.88
Santa Clara Valley Transportation Authority	MB	PT	3.68	\$0.00
Santa Clarita Transit	CB	PT	24.78	\$3.03
Santa Clarita Transit	DR	PT	6.11	\$1.14
Santa Clarita Transit	MB	PT	4.23	\$0.84
Santa Cruz Metropolitan Transit District	CB	DO	31.21	\$5.42
Santa Cruz Metropolitan Transit District	DR	DO	7.24	\$4.08
Santa Cruz Metropolitan Transit District	DT	PT	7.23	\$2.09
Santa Cruz Metropolitan Transit District	MB	DO	4.27	\$1.52
Santa Maria Area Transit	DR	PT	7.40	\$0.44
Santa Maria Area Transit	MB	PT	3.73	\$1.02
Santa Monica's Big Blue Bus	DR	PT	2.27	\$0.41
Santa Monica's Big Blue Bus	MB	DO	3.81	\$0.89
Solano County Transit	CB	PT	13.78	\$2.50
Solano County Transit	DR	PT	5.36	\$2.21
Solano County Transit	MB	PT	2.64	\$2.43
Sonoma County Transit	DR	PT	12.17	\$3.77
Sonoma County Transit	MB	PT	8.33	\$1.49
Southern California Regional Rail Authority dba: Metrolink	CR	PT	29.15	\$5.79
SunLine Transit Agency	DR	DO	12.02	\$2.05
SunLine Transit Agency	MB	DO	6.86	\$0.65
The Eastern Contra Costa Transit Authority	DR	PT	6.00	\$3.08
The Eastern Contra Costa Transit Authority	MB	PT	7.23	\$1.11
Torrance Transit System	DT	PT	5.20	\$1.74
Torrance Transit System	MB	DO	4.95	\$0.66
Transit Joint Powers Authority for Merced County	DR	PT	6.36	\$3.69
Transit Joint Powers Authority for Merced County	MB	PT	6.22	\$1.57

Agency	Mode	Type of Service	Length of Average Trip	Average Fare Cost per Trip
Unitrans - City of Davis/ASUCD	MB	DO	2.15	\$0.79
Ventura Intercity Service Transit Authority	CB	PT	20.34	\$1.60
Ventura Intercity Service Transit Authority	DR	PT	3.18	\$1.75
Ventura Intercity Service Transit Authority	MB	PT	4.37	\$0.85
Victor Valley Transit Authority	CB	PT	52.89	\$10.12
Victor Valley Transit Authority	DR	PT	13.17	\$2.96
Victor Valley Transit Authority	MB	PT	6.74	\$1.08
Victor Valley Transit Authority	VP	PT	48.72	\$4.17
Western Contra Costa Transit Authority	CB	PT	23.95	\$4.12
Western Contra Costa Transit Authority	DR	PT	8.15	\$1.35
Western Contra Costa Transit Authority	MB	PT	7.29	\$1.10
Yolo County Transportation District	DR	PT	12.25	\$4.88
Yolo County Transportation District	MB	PT	10.63	\$1.67
Yuba-Sutter Transit Authority	CB	PT	39.33	\$4.48
Yuba-Sutter Transit Authority	DR	PT	5.87	\$1.83
Yuba-Sutter Transit Authority	MB	PT	3.05	\$0.65