California Air Resources Board

User Guide

California Department of Resources Recycling and Recovery Organics Programs

California Climate Investments

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Table of Contents

Section A. Introduction 1
Updates 1
Program Assistance 1
Section B. Step-by-Step Guide 2
Overview 2
Step 1: Define the Project 3
Project Types 3
Step 2: Determine the Organics Benefits Calculator Tool Inputs Needed 4
Step 3a: Determine the Project-Specific Information Needed for Tree Planting (if applicable) 7
Step 3b: Determine the Project-Specific Irrigation Information (if applicable) 9
Step 4: Enter Project-Specific Values into i-Tree Planting (if applicable) 10
Step 4: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the Organics Benefits Calculator Tool 14
Section C. Example Projects 16

Table 1. Required Organics Benefits Calculator Tool Inputs for Eligible Project Types 4
Table 2. Required Information for Estimating Carbon Storage 7
Table 3. Required Information for Estimating GHG Emission Reductions from Building Energy Savings 8
Table 4. Required Inputs for Estimating Carbon Storage and Energy Savings 10
Table 5. i-Tree Planting Inputs 32

Figure 1. Steps to Estimating GHG Emission Reductions and Selected Co-benefits 2
Figure 2. i-Tree Planting CO_2 Benefits 12
Figure 3. i-Tree Planting Energy Benefits 12
Figure 4. i-Tree Planting Air Pollution Benefits 13
Figure 5. i-Tree Planting Water Savings Benefits 13
Figure 6. Example Project #1 – general information entered into Project Info tab 18
Figure 7. Example Project #1 – Compost tab inputs 18
Figure 8. Example Project #1 – Food tab inputs 19
Figure 9. Example Project #1 – Food tab inputs (cont.) 19
Figure 10. Example Project #1 – GHG Summary tab outputs 20
Figure 11. Example Project #1 – Co-benefit Summary tab outputs 20
Figure 12. Example #2 – general information entered into Project Info tab 22
Figure 13. Example #2 – Standalone AD inputs tab 23
Figure 14. Example Project #2 – GHG Summary tab outputs 24
Figure 15. Example Project #2 – Co-benefit Summary tab outputs 24
Figure 16. Example #3 – general information entered into Project Info tab 26
Figure 17. Example #3 – Co-digestion AD inputs tab 27

Figure 18. Example Project #3 – GHG Summary tab outputs 28
Figure 19. Example Project #3 – Co-benefit Summary tab outputs 28
Figure 20. Example #4 – general information entered into Project Info tab 30
Figure 21. Example #4 – Community Compost inputs tab 30
Figure 22. Location Information 33
Figure 23. Project Parameters 33
Figure 24. Tree Planting Configurations 34
Figure 25. i-Tree Planting Carbon Benefits 34
Figure 26. i-Tree Planting Energy Benefits 34
Figure 27. i-Tree Planting Air Pollution Benefits 35
Figure 28. i-Tree Planting Water Savings 35
Figure 29. Organics Calculator Inputs: Tree Planting Worksheet 36
Figure 30. Example Project #4 – GHG Summary tab outputs 36
Figure 31. Example Project #4 – Co-benefit Summary tab outputs 36

Section A. Introduction

For the California Department of Resources Recycling and Recovery (CalRecycle) Organics Programs (Organics) which include the Organics Grant Program, Food Waste Prevention and Rescue Grant Program, and the Community Compost Grant Program, California Air Resources Board (CARB) staff developed the Organics Benefits Calculator Tool and accompanying Organics Quantification Methodology to provide guidance for estimating the greenhouse gas (GHG) emission reductions and selected co-benefits of each proposed project type. This User Guide provides instructions for using the Organics Benefits Calculator Tool (Section B) and example projects (Section C).

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

- Addition of community compost and tree planting options;
- Updates to the step-by-step user guide with a new project example for community composting and tree planting;
- Updates to the emission factors for GHG and air pollutant emission reductions.

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 the Organics Programs should be sent to: GHGReductions@CalRecycle.ca.gov.

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 project are included in Section C.

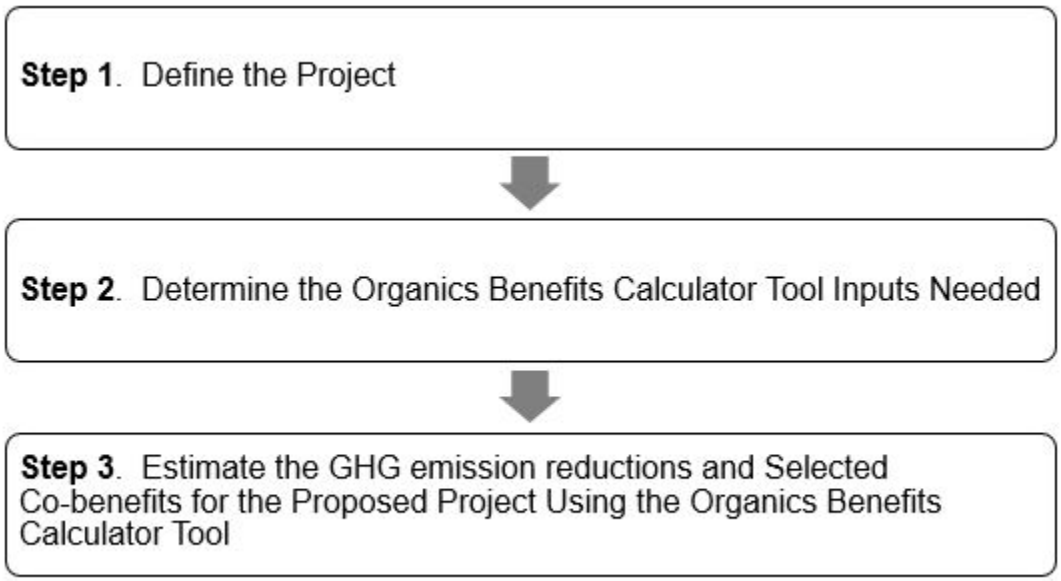


Figure 1. Steps to Estimating GHG Emission Reductions and Selected Co-benefits

Step 1: Define the Project

Applicants must define the project by identifying eligible Project Types that apply to the project. Applicants may incorporate more than one Project Type, as appropriate, to quantify the GHG emission reductions and selected co-benefits. The Project Types identified will determine which sections of the Organics Benefits Calculator Tool must be used in order to estimate the GHG emission reductions and selected co-benefits.

Project Types

The CalRecycle Organics Programs reduces GHG emissions by diversion or prevention of organic materials from landfills to composting, anaerobic digestion, or food rescue/prevention facilities. These calculations are based on estimates of tonnage of diverted material and emission reduction factors from published sources. This GHG quantification methodology applies to additional material only (i.e., material that would otherwise be sent to a landfill).

Projects will report the total project GHG emission reductions and select co-benefits estimated using this methodology as well as the total project GHG emission reductions per dollar of GGRF funds requested. CalRecycle developed 4 project types that meet the objectives of the Organics Programs and for which there are methods to quantify GHG emission reductions.[1] Other project features may be eligible for funding under the Organics Programs; however, each project requesting Greenhouse Gas Reduction Fund (GGRF) funding must include at least one of the following:

- Composting of organics;
- Standalone anaerobic digestion (AD) of organics producing biofuels or bioenergy;
- Co-Digestion of organics at wastewater treatment plants producing biofuels or bioenergy;
- Edible food rescue and food waste prevention; and
- Tree planting.

[1] CalRecycle's Greenhouse Gas Reduction Grant and Loan Programs

Step 2: Determine the Organics 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 Organics Benefits Calculator Tool by project type.

Table 1. Required Organics Benefits Calculator Tool Inputs for Eligible Project Types

ALL PROJECTS
General Information (Project Info worksheet) • Project Name; • Grant ID, if applicable; • Contact Name; • Contact Phone Number; • Contact Email; • Date Completed; • Total amount of Organics GGRF funds requested from this solicitation to implement the project; • Total amount of additional GGRF funds to implement the project (include GGRF funds previously awarded to the project by CalRecycles's Organics Programs or another California Climate Investments program, GGRF funds currently being requested from another California Climate Investments program, and GGRF funds the project plans to request in the future from CalRecycles's Organics Programs or another California Climate Investments program); and • Identify California Climate Investments program(s) from which the project has been awarded GGRF funds (include award date), is currently requesting GGRF funds, or plans to request GGRF funds. For a list of GGRF funded programs, go to: ww2.arb.ca.gov/cci-funded-programs.
Composting Projects
Quantification Inputs (Compost worksheet) • Feedstock Diverted for Windrow Composting (Short Tons); • Feedstock Diverted for ASP System Composting (Short Tons); • Composition of Food Waste in Feedstock (%); • Composition of Green Waste in Feedstock (%); and • Residual Material (Short tons).

Standalone AD Projects
Quantification Inputs (Standalone AD worksheet) • Digestate Handling; • Final Use of Generated Fuel; • Electricity Generation Device; • Type of Vehicle Fuel; • Low NOx Vehicle; • Feedstock Diverted for Anaerobic Digestion (short tons); and • Residual Material (Short tons).
Co-Digestion AD Projects
Quantification Inputs (Co-Digestion worksheet) • Facility Size; • Digestate Handling; • Final Use of Generated Fuel; • Electricity Generation Device; • Type of Vehicle Fuel; • Low NOx Vehicle; • Feedstock Diverted for Anaerobic Digestion (short tons); and • Residual Material (Short tons).
Source Reduction of Food Waste or Edible Food Rescue
Quantification Inputs (Food worksheet) • Equipment Type; • Number of Identical Units; • Volume of System (ft^3); • Refrigerant Charge Size (lbs); • Refrigerant Type; • New Vehicle Type; • Number of Identical Vehicles; • Edible Food Rescued (short tons); and • Source Reduction of Food Waste (short tons).
Community Composting Projects
Quantification Inputs (Community Composting worksheet) • Composting Production (cubic yards); and • Composition of Food Waste in Feedstock (%).

Tree Planting Projects
Quantification Inputs (Tree Planting worksheet) • Group Identifier; and • Tree Group Characteristics; • Quantity of Trees to be Planted within Tree Group (number of trees); • Carbon Stored in Tree Group Over the 40 Year Quantification Period (lb CO2e); • Electricity Savings From Tree Group Over the 40 Year Quantification Period (kWh); • Natural Gas Savings From Tree Group Over the 40 Year Quantification Period (MMBtu); • NO_2 Removed Over the 40 Year Quantification Period (lb); • $PM_{2.5}$ Removed Over the 40 Year Quantification Period (lb); • Rainfall Interception Over the 40 Year Quantification Period (gal); and • Avoided Runoff Over the 40 Year Quantification Period (gal).

Step 3a: Determine the Project-Specific Information Needed for Tree Planting (if applicable)

The following subsections describe the information needed to estimate the carbon stored in planted trees using i-Tree Planting and GHG emission reductions from building energy savings using i-Tree Planting. i-Tree Planting is accessed through a web-based application.

Tree Planting

Table 2 describes the information needed to estimate carbon stored in trees planted by the project using the two carbon accounting tools for urban trees.

Table 2. Required Information for Estimating Carbon Storage

i-Tree Planting
Age of trees 40 years after project start i-Tree Planting uses "years for the project" and the diameter at breast height (DBH) at time of planting to provide an estimate of total carbon stored. The "years for project" input is the age of the tree 40 years from the start of the project. Applicants must estimate the age of the trees at the time of planting and at the end of the project life (quantification period). For example, if a project that starts in 2020 plants a 1 year old tree in 2022, the age input will be 39 years (age of tree in 2060).

i-Tree Planting
Project location/Climate zone where tree planting will occur The drop down menus in i-Tree Planting tool allow the user to select the location of the project (State, County, City), which will provide the climate zone information required by the tool.

If tree planting sites are strategically selected to shade buildings (i.e., planted within 60 feet), applicants can also account for GHG emission reductions from building energy savings by entering additional information. Table 3 describes the information needed to estimate GHG emission reductions from energy savings.

Table 3. Required Information for Estimating GHG Emission Reductions from Building Energy Savings

i-Tree Planting
Tree Location and Building Energy Use To calculate building energy savings, i-Tree Planting requires inputs for tree azimuth (compass bearing taken from the nearest air-conditioned building to the tree location), distance from the nearest air-conditioned/heated building, building vintage, and type of climate controls of nearest building. Because it is unlikely that specific tree site locations will be identified at the time of application submission, applicants can extrapolate information from previous planting efforts and neighborhood characteristics.

Project location where tree planting will occur
Using the drop-down menus in the i-Tree Planting tool, users can select the location of the project (State, County, City).

Step 3b: Determine the Project-Specific Irrigation Information (if applicable)

If the project involves additional irrigation, this may result in additional water use that needs to be accounted for when determining water savings of the project. Organics projects fall under Category 3 Urban Landscaping of the Water Savings Co-benefit Assessment Methodology.[2] Per that methodology, users estimate water use with the California Department of Water Resources' Water Budget Calculator for New and Rehabilitated Residential/Non-Residential Landscapes[3] and the University of California's Division of Agriculture and Natural Resources' Water Use Classification of Landscape Species (WUCOLS IV).[4] The Water Savings Co-benefit Assessment Methodology includes information on the required inputs on page 11 and an example of how to use the tools on page 18 (Appendix C). If the project involves additional irrigation, the user must input the annual baseline and project water use (gallons) into the Organics calculator to calculate the total water savings of the project. The Water Savings Co-benefit Assessment Methodology is available at: www.arb.ca.gov/cci-cobenefits. Questions related to estimating water savings should be sent to CARB at: GGRFProgram@arb.ca.gov.

[2] California Air Resources Board (2018). Co-Benefit Assessment Methodology for Water Savings. https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/final_water_am.pdf

[3] California Department of Water Resources (2017). Water Budget Calculator for New and Rehabilitated Residential/Non-Residential Landscapes Beta version 1.30 http://water.ca.gov/wateruseefficiency/landscapeordinance/docs/BetaWaterBudgetNonResidentialV130.xlsm

[4] University of California, Division of Agriculture and Natural Resources. Water Use Classification of Landscape Species (WUCOLS IV) http://ucanr.edu/sites/WUCOLS/Plant_Search/

Step 4: Enter Project-Specific Values into i-Tree Planting (if applicable)

This section provides instruction on using the project-specific values determined in Step 3a and emission factors provided to estimate the carbon stored in trees and GHG emission reductions from building energy savings.

Tree Planting

i-Tree Planting

After navigating to the web-based tool, i-Tree Planting,[5] select "Get Started" to enter in project specific data. For each tree and tree planting site modeled, enter values into the drop-down menus or entry boxes as indicated in Table 4.

User Tip:
i-Tree Planting calculates tree carbon storage and emission reductions from building energy savings based on a like group of trees. Applicants should use as many groups as necessary to accurately model their proposed project.

Table 4. Required Inputs for Estimating Carbon Storage and Energy Savings

Location Inputs	Description
State/Province	Select California in the drop-down menu.
County/Division	Select the County the project is located in.
City	Select the City the project is located in or nearest to.

[5] United States Department of Agriculture, Forest Service. i-Tree Planting Calculator version 1.2.0. https://planting.itreetools.org/

Project Parameter Inputs	Description
Electricity Emissions Factor	Enter 227.9 kg CO_2e/MWh
Units	Select kilograms CO_2e/MWh
Fuel Emissions Factor	53.1 kg CO_2e/MMBtu
Units	Select kilograms CO_2e/MMBtu
Years for the Project	The number of years to be input is the age of the tree 40 years from the start of the project. For example, if a project that starts in 2020 plants a 1 year old tree in 2022, the age input is 39 years (age of tree in 2060).
Tree Mortality over Project Quantification Period, as an estimated percentage	Enter 0 (The Organics Benefits Calculator Tool will account for tree mortality).

Tree Planting Configuration Inputs	Description
Units	Select English (feet & inches).
Nomenclature	Applicant can choose either Common Name or Scientific Name.
Species	Select the species of tree. Applicants can add multiple types of species by selecting the "+" next to "Group Number."
DBH in Inches	Enter the DBH at time of planting.
Distance to Nearest in Feet	Select the distance to the nearest climate controlled building in feet from the drop down menu.
Tree is _____ of Building	Select the direction in which the tree is located from the building (e.g., North, South, etc.) from the drop-down menu. (**Note**: This is measured as if you are standing at the nearest air-conditioned building and measuring the cardinal direction to the planted tree location using a compass)
Vintage	Select the vintage of the nearby building from the drop-down menu (Options: Built after 1980, Built 1950-1980, or Built before 1950).
Climate Controls	Select the type of climate controls the nearby building has installed. (**Note:** If a tree is planted greater than 60 feet away from an air conditioned building, select "None".)
Condition	Select the condition of the overall health of the trees at the time of planting.
Exposure to Sunlight	Select the amount of sun that reaches the leaves of the tree based on its surroundings (Options: Full Sun, Partial Sun, or Full Shade).

Tree Planting Configuration Inputs	Description
Number of Trees	Enter the number of trees that are the same species and have the same characteristics (e.g., distance to building, location in respect to building, exposure to sunlight, etc.). If some of the characteristics change between trees, multiple lines of the same species should be input into the tool.

Planting Report Inputs	Description
Units	English (pounds & tons; kWh & MMBtu; gallons)

The i-Tree Planting tool provides multiple benefit outputs including carbon sequestration, energy savings, air pollutant removal and water savings benefits for each group identifier. The applicant will enter the data in the output fields, shown circled in red in Figures 2 through 5, from each tree group into the Organics Calculator Tool in order to calculate the total benefits for the project. Print the planting reports and submit along with your Organics grant application. For a step-by-step project example that shows how to input the i-Tree results into the Organics Benefits Calculator Tool, see Section C of this document.

Figure 2. i-Tree Planting CO_2 Benefits

Location		CO_2 Benefits			
Group Identifier	Tree Group Characteristics	CO_2 Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
1	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	-6,339.9	$-147.45	79,321.6	$1,844.78
2	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	0.0	$0.00	79,321.6	$1,844.78

Figure 3. i-Tree Planting Energy Benefits

Location		Energy Benefits			
Group Identifier	Tree Group Characteristics	Electricity Saved (kWh)	Electricity Saved ($)	Fuel Saved (MMBtu)	Fuel Saved ($)
1	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	54,347.4	$8,398.48	-320.4	$-3,646.86
2	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	0.0	$0.00	0.0	$0.00

Figure 4. i-Tree Planting Air Pollution Benefits

Location		Air Benefits							
Group Identifier	Tree Group Characteristics	O_3 Removed (pounds)	NO_2 Avoided (pounds)	NO_2 Removed (pounds)	SO_2 Avoided (pounds)	SO_2 Removed (pounds)	VOC Avoided (pounds)	$PM_{2.5}$ Avoided (pounds)	$PM_{2.5}$ Removed (pounds)
1	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	548.7	-0.3	144.5	-0.9	38.0	25.5	17.2	19.4
2	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	548.7	0.0	144.5	0.0	38.0	0.0	0.0	19.4

Figure 5. i-Tree Planting Water Savings Benefits

Location		Ecosystem Services			
Group Identifier	Tree Group Characteristics	Tree Biomass (short ton)	Rainfall Interception (gallons)	Avoided Runoff (gallons)	Avoided Runoff ($)
1	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	19.1	172,245.4	52,382.8	$468.09
2	• (15) Cedar, Deodar (Cedrus deodara) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	19.1	172,245.4	52,382.8	$468.09

Step 4: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the Organics Benefits Calculator Tool

Applicants must use the Organics Benefits Calculator Tool to complete this step. The Organics 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 requirements to allow the calculations to be reviewed and replicated.

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

The **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 fields are not applicable and no user input is necessary.

If an optional field is used, the applicant must submit additional supporting documentation (see the **Documentation** tab in the Organics Benefits Calculator Tool).

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

- Total Organics Program GHG emission reductions (metric tons of carbon dioxide equivalent ($MTCO_2e$));[6]
- Total GHG emission reductions ($MTCO_2e$);
- Total GHG emission reductions per total Organics GGRF funds ($MTCO_2e/\$$);
- Total GHG emission reductions per total funds ($MTCO_2e/\$$);
- Total Organics Program GGRF Funds per Total GHG emission reductions ($\$/MTCO_2e$); and
- Total Funds per Total GHG emission reductions ($\$/MTCO_2e$).

[6] This is the portion of GHG emission reductions attributable to funding from the Organics Programs; GHG emission reductions are prorated according to the level of program funding contributed from the Organics Programs 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.

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);
- Fossil fuel use reductions (gallons and kWh);
- Energy and fuel cost savings (dollars);
- Renewable fuel generation (gallons and scf);
- Renewable energy generation (kWh);
- Compost production (dry tons);
- Compost application area (acres treated with compost soil amendments);
- Edible food rescued and donated (tons);
- Material diverted from landfill (tons);
- Reduction in vehicle miles traveled (miles);
- Trees planted (number of trees); and
- Water savings (gallons).

Using the same inputs for estimating GHG emission reductions, the Organics Benefits Calculator Tool also estimates criteria and toxic emission reductions. Because criteria and toxic emissions have a local impact compared to GHG emissions which have a global impact, criteria and toxic emissions are broken into two categories: local and remote. Local emissions are those that take place at the project location. This can include emissions from process emissions, emissions from a generator or boiler, or onsite fossil fuel usage, etc. Remote emissions are those that take place outside of the project location boundary and can include electricity generation emissions from the electrical grid, reduction in diesel usage due to new RNG vehicles, etc. The Organics Benefits Calculator Tool calculates these emissions separately in the Co-benefit Summary Tab and also provides the net benefit.

Section C. Example Projects

Introduction

The following example projects are hypothetical projects[7] to demonstrate how the Organics Benefits Calculator Tool would be applied. These hypothetical projects do not provide examples of the supporting documentation that is required of actual project applicants.

A. Example #1: Aerated Static Pile Composting Facility

Overview of the proposed project

A Sacramento based applicant is proposing to construct a new aerated static pile (ASP) composting facility. The composting facility would divert 1,000 tons of organic material a year to ASP composting. The composition of the feedstock would be 30% food waste and 70% green waste. There would be 50 tons a year of residual material that would be sent back to a landfill.

The applicant is proposing to partner with a local food bank to rescue 200,000 lbs of food each year for ten years to provide food to the local community. As a part of the application, they plan to purchase one commercial refrigerator/freezer with solid doors that has a volume of 50 ft^3. The refrigerant charge size and refrigerant type are unknown. The food bank also proposes to buy a refrigerated hybrid van for pickups and deliveries of the rescued food.

The applicant is asking for $2,000,000 and proposes to leverage $500,000 from other local sources for a total proposed cost of $2,500,000.

[7] The hypothetical project has not undergone verification of any Organics Programs requirements; all assumptions about location type and project features are for Organics Benefits Calculator Tool demonstration purposes only.

Methods to apply

Step 1: Determine the Organics Benefits Calculator Tool Inputs Needed

General Information	
Total Organics Grant Funds Requested	$2,000,000
Non-GGRF Leveraged Funds	$500,000
Quantification Inputs (Compost Tab)	
Feedstock Diverted for ASP System Composting	1,000 short tons per year
Composition of Food Waste in Feedstock	30%
Composition of Green Waste in Feedstock	70%
Residual Material	50 short tons per year
Quantification Inputs (Food Tab)	
Refrigeration Equipment Type	Commercial Refrigerator/freezer with solid doors
Number of Identical Units	1
Volume of System	50
Refrigerant Charge Size	Unknown – leave blank
Refrigerant Type	Unknown – enter default value
New Vehicle Type	Refrigerated Hybrid Van
Number of Identical Vehicles	1
Edible Food Rescued	100 short tons per year (converted from 200,000 lbs per year)

Step 2: Estimate GHG emission reductions and Air Pollutant Emission Co-benefits for the Proposed Project Using the Food Waste Prevention and Rescue Program Benefits Calculator Tool

Once the Organics Benefits Calculator Tool is accessed the applicant must complete the project identifier information on the "Read Me" tab.

Project Name:	Sacramento Composting Facility	
Applicant ID:	*To be completed by CalRecycle*	
Contact Name:	John Smith	
Contact Phone Number:	916-555-1234	
Contact Email:	John.Smith@compost.com	
Date Calculator Completed:	8/1/2019	
Total Organics GGRF Funds Requested ($):	$	2,000,000
Other GGRF Leveraged Funds ($):		
Non-GGRF Leveraged Funds ($):	$	500,000
Total Funds ($):	$	2,500,000

Figure 6. Example Project #1 – general information entered into Project Info tab

Compost Inputs Tab

Applicants must enter data into the green cells within the "Compost" tab. The required data in the "Compost" tab reflect project specific information. See the following figures for how the data should be entered for this example project.

Composting Worksheet

Year	Feedstock Diverted for Windrow Composting (Short Tons)	Feedstock Diverted for ASP System Composting (Short Tons)	Composition of Food Waste in Feedstock (%)	Composition of Green Waste in Feedstock (%)	Residual Material (Short Tons)	Net GHG Benefit ($MTCO_2e$)
Year 1	0	1,000	30%	70%	50	228
Year 2	0	1,000	30%	70%	50	228
Year 3	0	1,000	30%	70%	50	228
Year 4	0	1,000	30%	70%	50	228
Year 5	0	1,000	30%	70%	50	228
Year 6	0	1,000	30%	70%	50	228
Year 7	0	1,000	30%	70%	50	228
Year 8	0	1,000	30%	70%	50	228
Year 9	0	1,000	30%	70%	50	228
Year 10	0	1,000	30%	70%	50	228
SUBTOTAL	0	10,000	-	-	500	2,280

Figure 7. Example Project #1 – Compost tab inputs

Food Inputs Tab

Applicants must enter data into the green cells within the "Food" tab. Blue cells are optional. The required data in the "Food" tab reflect project specific information. See the following figures for how the data should be entered for this example project.

Food Waste Prevention Worksheet

New Refrigeration Equipment for Project (if necessary)

Equipment Type (select from options)	Number of Identical Units	Volume of System (ft^3)	Refrigerant Charge Size - *Optional Input* (lbs)	Refrigerant Type (select from options)	Annual GHG Emissions from Refrigeration Equipment (MTCO2e/Year)
Commercial Refrigerator with solid doors	1	50		Default Value	2
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0
				Default Value	0

New Vehicles for Project (if necessary)

New Vehicle Type (select from options)	Number of Identical Vehicles	Annual GHG Emissions from New Vehicle (MTCO2e/Year)
Refrigerated Hybrid Van	1	12
		0
		0
		0
		0
		0

Figure 8. Example Project #1 – Food tab inputs

Year	Edible Food Rescued (Short Tons)	Source Reduction of Food Waste (Short Tons)	Net Tons of Material Diverted (Short Tons)	Net GHG Benefit ($MTCO_2e$)
Year 1	100		100	164
Year 2	100		100	164
Year 3	100		100	164
Year 4	100		100	164
Year 5	100		100	164
Year 6	100		100	164
Year 7	100		100	164
Year 8	100		100	164
Year 9	100		100	164
Year 10	100		100	164
SUBTOTAL	1,000	0	1,000	**1,643**

Figure 9. Example Project #1 – Food tab inputs (cont.)

Project Summary Tabs

Project reporting metrics and a summary of the overall project GHG emission reductions, air pollutant emission co-benefits, and key variables are provided on the "GHG Summary" and "Co-benefit Summary" tabs.

Project Information		
Project Name		Sacramento Composting Facility
Total Organics GGRF Funds Requested ($)	$	2,000,000
Other GGRF Leveraged Funds ($)	$	-
Non-GGRF Leveraged Funds ($)	$	500,000
Total Funds ($)	$	2,500,000

GHG Summary		
Total Organics Grant GHG Emission Reductions ($MTCO_2e$)		3,138
Total GHG Emission Reductions ($MTCO_2e$)		3,923
Total GHG Emission Reductions per Total Organics Grant GGRF Funds ($MTCO_2e$/$)		0.001961
Total GHG Emission Reductions per Total Funds ($MTCO_2e$/$)		0.001569
Total Organics Grant GGRF Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$	509.86
Total Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$	637.33

Figure 10. Example Project #1 – GHG Summary tab outputs

Fuel and energy co-benefits

Fossil fuel use reductions (onsite reductions) over Quantification Period	0	gallons*	Note: Positive values indicate reductions, while negative values indicate increases
Fossil fuel use reductions (onsite reductions) over Quantification Period	0	kWh	Note: Positive values indicate reductions, while negative values indicate increases
Energy and fuel cost savings (onsite) over Quantification Period	-$28,744	dollars	Note: Positive values indicate cost savings, while negative values indicate cost increases
Renewable fuel generation over Quantification Period	0	gallons*	
Renewable fuel generation over Quantification Period	0	scf	
Renewable energy generation over Quantification Period	0	kWh	

*diesel gallons equivalent

Air pollutant co-benefits	local	remote	total	
ROG Emission Reductions over Quantification Period	0	695	695	lbs
NOx Emission Reductions over Quantification Period	0	909	909	lbs
PM2.5 Emission Reductions over Quantification Period	0	605	605	lbs
Diesel PM Emission Reductions over Quantification Period	0	1	1	lbs

Soil health co-benefits

Compost production	3,629	Dry tons
Compost application area	44	Acres to be treated with compost soil ammendments

Note: Positive values indicate compost production, while negative values indicate reductions in compost production

Waste reduction co-benefits

Edible Food Rescued & Donated	1,000	Tons
Material Diverted from Landfill	10,500	Tons
Vehcile Miles Taveled	-131,230	Miles

Figure 11. Example Project #1 – Co-benefit Summary tab outputs

Submit Documentation

To complete the quantification process, the applicant must submit an electronic copy of the calculator (in .xlsx) and all the required documentation as noted in Section C of this Quantification Methodology.

B. Example #2: Standalone Anaerobic Digestion Facility

Overview of the proposed project

A Los Angeles based applicant is proposing to construct a new Standalone AD facility. The AD facility would divert 2,000 tons of organic material a year to digestion. There would be 100 tons a year of residual material that would be sent back to a landfill. The biomethane that is produced at the facility would go to fuel renewable natural gas (RNG) vehicles with a low NOx engine. The digestate would be composted once the digestion process is finished.

The applicant is asking for $3,000,000 and proposes to leverage $1,000,000 from other local sources for a total proposed cost of $4,000,000.

Methods to apply

Step 1: Determine the Organics Benefits Calculator Tool Inputs Needed

General Information	
Total Organics Grant Funds Requested	$3,000,000
Non-GGRF Leveraged Funds	$1,000,000
Quantification Inputs (Standalone AD Tab)	
Digestate Handling	Compost
Final Use of Generated Fuel	Vehicle Fuel
Type of Vehicle Fuel	RNG
Low NOx Vehicle	Yes
Feedstock Diverted for Anaerobic Digestion	2,000 short tons per year
Residual Material	100 short tons per year

Step 2: Estimate GHG emission reductions and Air Pollutant Emission Co-benefits for the Proposed Project Using the Food Waste Prevention and Rescue Program Benefits Calculator Tool

Once the Organics Benefits Calculator Tool is accessed the applicant must complete the project identifier information on the "Read Me" tab.

Project Name:	Los Angeles AD Facility	
Applicant ID:	*To be completed by CalRecycle*	
Contact Name:	John Smith	
Contact Phone Number:	661-555-1234	
Contact Email:	John.Smith@adproject.com	
Date Calculator Completed:	8/1/2019	
Total Organics GGRF Funds Requested ($):	$	3,000,000
Other GGRF Leveraged Funds ($):		
Non-GGRF Leveraged Funds ($):	$	1,000,000
Total Funds ($):	$	4,000,000

Figure 12. Example #2 – general information entered into Project Info tab

Standalone AD Inputs Tab

Applicants must enter data into the green cells within the "Standalone AD" tab. The required data in the "Standalone AD" tab reflect project specific information. See the following figures for how the data should be entered for this example project.

Standalone Anaerobic Digestion (AD) Worksheet

Digestate Handling	Compost
Final Use of Generated Fuel	Vehicle Fuel
Type of Vehicle Fuel	RNG
Low NOx Vehicle?	Yes

Year	Feedstock Diverted for Anaerobic Digestion (Short Tons)	Residual Material (Short Tons)	Net GHG Benefit ($MTCO_2e$)
Year 1	2,000	100	741
Year 2	2,000	100	741
Year 3	2,000	100	741
Year 4	2,000	100	741
Year 5	2,000	100	741
Year 6	2,000	100	741
Year 7	2,000	100	741
Year 8	2,000	100	741
Year 9	2,000	100	741
Year 10	2,000	100	741
SUBTOTAL	20,000	1,000	7,410

Figure 13. Example #2 – Standalone AD inputs tab

Project Summary Tabs

Project reporting metrics and a summary of the overall project GHG emission reductions, air pollutant emission co-benefits, and key variables are provided on the "GHG Summary" and "Co-benefit Summary" tabs.

Project Information		
Project Name	Los Angeles AD Facility	
Total Organics GGRF Funds Requested ($)	$	3,000,000
Other GGRF Leveraged Funds ($)	$	-
Non-GGRF Leveraged Funds ($)	$	1,000,000
Total Funds ($)	$	4,000,000

GHG Summary	
Total Organics Grant GHG Emission Reductions ($MTCO_2e$)	5,558
Total GHG Emission Reductions ($MTCO_2e$)	7,410
Total GHG Emission Reductions per Total Organics Grant GGRF Funds ($MTCO_2e$/$)	0.002470
Total GHG Emission Reductions per Total Funds ($MTCO_2e$/$)	0.001853
Total Organics Grant GGRF Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$ 404.86
Total Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$ 539.81

Figure 14. Example Project #2 – GHG Summary tab outputs

Fuel and energy co-benefits

Fossil fuel use reductions (onsite reductions) over Quantification Period	-3,481	gallons*	Note: Positive values indicate reductions, while negative values indicate increases
Fossil fuel use reductions (onsite reductions) over Quantification Period	-1,298,397	kWh	Note: Positive values indicate reductions, while negative values indicate increases
Energy and fuel cost savings (onsite) over Quantification Period	-$179,391	dollars	Note: Positive values indicate cost savings, while negative values indicate cost increases
Renewable fuel generation over Quantification Period	354,518	gallons*	
Renewable fuel generation over Quantification Period	0	scf	
Renewable energy generation over Quantification Period	0	kWh	

*diesel gallons equivalent

Air pollutant co-benefits	local	remote	total	
ROG Emission Reductions over Quantification Period	-82	1,721	1,639	lbs
NOx Emission Reductions over Quantification Period	-661	6,591	5,930	lbs
PM2.5 Emission Reductions over Quantification Period	-28	223	195	lbs
Diesel PM Emission Reductions over Quantification Period	-22	26	4	lbs

Soil health co-benefits

Compost production	6,097	Dry tons
Compost application area	73	Acres to be treated with compost soil ammendments

Note: Positive values indicate compost production, while negative values indicate reductions in compost production

Waste reduction co-benefits

Edible Food Rescued & Donated	0	Tons
Material Diverted from Landfill	19,000	Tons
Vehcile Miles Taveled	0	Miles

Figure 15. Example Project #2 – Co-benefit Summary tab outputs

Submit Documentation

To complete the quantification process, the applicant must submit an electronic copy of the calculator (in .xlsx) and all the required documentation as noted in Section C of this Quantification Methodology.

C. Example #3: Co-digestion Anaerobic Digestion Facility

Overview of the proposed project

A Fresno based applicant is proposing to digest newly diverted organic matter in a wastewater facility. The wastewater treatment plant currently treats 30 million gallons per day. The facility would divert 2,000 tons of organic material a year to digestion at the wastewater treatment plant. There would be 100 tons a year of residual material that would be sent back to a landfill. The biomethane that is produced at the facility would go to electricity generation with the onsite fuel cell. The digestate would be land applied once the digestion process is finished.

The applicant is asking for $3,000,000 and proposes to leverage $1,000,000 from other local sources for a total proposed cost of $4,000,000.

Methods to apply

Step 1: Determine the Organics Benefits Calculator Tool Inputs Needed

General Information	
Total Organics Grant Funds Requested	$3,000,000
Non-GGRF Leveraged Funds	$1,000,000
Quantification Inputs (Standalone AD Tab)	
Facility Size	More than or equal to 21 million gallons treated per day
Digestate Handling	Land Application
Final Use of Generated Fuel	Electricity Generation
Electricity Generation Device	Fuel Cell
Feedstock Diverted for Anaerobic Digestion	2,000 short tons per year
Residual Material	100 short tons per year

Step 2: Estimate GHG emission reductions and Air Pollutant Emission Co-benefits for the Proposed Project Using the Food Waste Prevention and Rescue Program Benefits Calculator Tool

Once the Organics Benefits Calculator Tool is accessed the applicant must complete the project identifier information on the "Read Me" tab.

Project Name:	Fresno Wastewater Treatment Facility	
Applicant ID:	*To be completed by CalRecycle*	
Contact Name:	John Smith	
Contact Phone Number:	559-555-1234	
Contact Email:	John.Smith@wwproject.com	
Date Calculator Completed:	8/1/2019	
Total Organics GGRF Funds Requested ($):	$	3,000,000
Other GGRF Leveraged Funds ($):		
Non-GGRF Leveraged Funds ($):	$	1,000,000
Total Funds ($):	$	4,000,000

Figure 16. Example #3 – general information entered into the Project Info tab

Co-Digestion Inputs Tab

Applicants must enter data into the green cells within the "Co-Digestion" tab. The required data in the "Co-Digestion" tab reflect project specific information. See the following figures for how the data should be entered for this example project.

Co-Digestion of Organics at Wastewater Treatment Plants (Co-Digestion) Worksheet	
Facility Size	More than or equal to 21 million gallons treated per day
Digestate Handling	Land Application
Final Use of Generated Fuel	Electricity Generation
Electricity Generation Device	Fuel Cell

Year	Feedstock Diverted for Anaerobic Digestion (Short Tons)	Residual Material (Short Tons)	Net GHG Benefit ($MTCO_2e$)
Year 1	2,000	100	475
Year 2	2,000	100	475
Year 3	2,000	100	475
Year 4	2,000	100	475
Year 5	2,000	100	475
Year 6	2,000	100	475
Year 7	2,000	100	475
Year 8	2,000	100	475
Year 9	2,000	100	475
Year 10	2,000	100	475
SUBTOTAL			4,750

Figure 17. Example #3 – Co-digestion AD inputs tab

Project Summary Tabs

Project reporting metrics and a summary of the overall project GHG emission reductions, air pollutant emission co-benefits, and key variables are provided on the "GHG Summary" and "Co-benefit Summary" tabs.

Project Information		
Project Name	Fresno Wastewater Treatment Facility	
Total Organics GGRF Funds Requested ($)	$	3,000,000
Other GGRF Leveraged Funds ($)	$	-
Non-GGRF Leveraged Funds ($)	$	1,000,000
Total Funds ($)	$	4,000,000

GHG Summary		
Total Organics Grant GHG Emission Reductions ($MTCO_2e$)		3,563
Total GHG Emission Reductions ($MTCO_2e$)		4,750
Total GHG Emission Reductions per Total Organics Grant GGRF Funds ($MTCO_2e/\$$)		0.001583
Total GHG Emission Reductions per Total Funds ($MTCO_2e/\$$)		0.001188
Total Organics Grant GGRF Funds per Total GHG Emission Reductions ($/MTCO_2e$)	$	631.58
Total Funds per Total GHG Emission Reductions ($/MTCO_2e$)	$	842.11

Figure 18. Example Project #3 – GHG Summary tab outputs

Fuel and energy co-benefits

Fossil fuel use reductions (onsite reductions) over Quantification Period	-8,734	gallons*	Note: Positive values indicate reductions, while negative values indicate increases
Fossil fuel use reductions (onsite reductions) over Quantification Period	0	kWh	Note: Positive values indicate reductions, while negative values indicate increases
Energy and fuel cost savings (onsite) over Quantification Period	-$30,832	dollars	Note: Positive values indicate cost savings, while negative values indicate cost increases
Renewable fuel generation over Quantification Period	0	gallons*	
Renewable fuel generation over Quantification Period	0	scf	
Renewable energy generation over Quantification Period	3,558,095	kWh	

*diesel gallons equivalent

Air pollutant co-benefits	local	remote	total	
ROG Emission Reductions over Quantification Period	-2,577	1,822	-755	lbs
NOx Emission Reductions over Quantification Period	-8,450	1,094	-7,356	lbs
PM2.5 Emission Reductions over Quantification Period	-1,147	383	-764	lbs
Diesel PM Emission Reductions over Quantification Period	-55	0	-55	lbs

Soil health co-benefits

Compost production	0	Dry tons
Compost application area	0	Acres to be treated with compost soil ammendments

Note: Positive values indicate compost production, while negative values indicate reductions in compost production

Waste reduction co-benefits

Edible Food Rescued & Donated	0	Tons
Material Diverted from Landfill	19,000	Tons
Vehcile Miles Taveled	0	Miles

Figure 19. Example Project #3 – Co-benefit Summary tab outputs

Submit Documentation

To complete the quantification process, the applicant must submit an electronic copy of the calculator (in .xlsx) and all of the required documentation as noted in Section C of this Quantification Methodology.

D. Example #4: Community Compost and Tree Planting

Overview of the proposed project

A Sacramento based applicant is proposing to create a new green space in her local community. The applicant plans to open the green space to local community members to bring their green waste and food waste for composting. The finished compost will be shared among the community members. They also plan to plant four trees in the green space to provide fresh fruit to the community.

The applicant is asking for $50,000 for the project.

Methods to apply

Step 1: Determine the Organics Benefits Calculator Tool Inputs Needed

General Information	
Total Organics Funds Requested	$50,000
Non-GGRF Leveraged Funds	$0
Quantification Inputs (Community Compost Tab)	
Compost Production	20 cubic yards per year
Composition of Food Waste in Feedstock	40%
Quantification Inputs (Tree Planting Tab)	
All inputs	See screenshots below for how to enter inputs from i-Tree Planting into the Tree Planting Tab.

Step 2: Estimate GHG emission reductions and Air Pollutant Emission Co-benefits for the Proposed Project Using the Organics Program Benefits Calculator Tool

Once the Organics Benefits Calculator Tool is accessed the applicant must complete the project identifier information on the "Read Me" tab.

Project Name:	Sacramento Garden
Applicant ID:	*To be completed by CalRecycle*
Contact Name:	John Smith
Contact Phone Number:	916-555-1234
Contact Email:	John.Smith@garden.com
Date Calculator Completed:	3/1/2020
Total Organics GGRF Funds Requested ($):	$ 50,000
Other GGRF Leveraged Funds ($):	
Non-GGRF Leveraged Funds ($):	
Total Funds ($):	$ 50,000

Figure 20. Example #4 – general information entered into Project Info tab

Community Compost Inputs Tab

Applicants must enter data into the green cells within the "Community Compost" tab. The required data in the "Community Compost" tab reflect project specific information. See the following figures for how the data should be entered for this example project.

Composting Worksheet

Year (January-December)	Compost Production (cubic yards)	Composition of Food Waste in Feedstock (%)	Composition of Green Waste in Feedstock (%)	Net GHG Benefit ($MTCO_2e$)
Year 1	20	40%	60%	5
Year 2	20	40%	60%	5
Year 3	20	40%	60%	5
Year 4	20	40%	60%	5
Year 5	20	40%	60%	5
			SUBTOTAL	26

Figure 21. Example #4 – Community Compost inputs tab

Use i-Tree Planting to Determine GHG Benefits of Tree Plantings

Project applicants must use i-Tree Planting for calculating the carbon storage and energy savings of tree planting. This section illustrates an example project using i-Tree Planting to plant 4 trees. Because i-Tree Planting groups similar trees together, two groups will be needed to account for all the variations of the tree planting activities. The first group will account for apple trees close to an air conditioned building, which will shade the building (Figure 24, Group 1). The second group of peach trees are 75 feet away from a building and do not provide shade benefits (Figure 24, Group 2). Utilizing Table 4 for reference, the i-Tree Planting project specific inputs for planting the 2 apple and 2 peach trees are compiled. The required inputs are as follows:

Table 5. i-Tree Planting Inputs

Location Tab	
State/Province	Select "California" in the drop down menu.
County/Division	Select "Sacramento".
City	Select "Sacramento".
Project Parameters	
Electricity Emissions Factor	Enter 227.9 kg CO_2e/MWh (required default factor).
Units	Select "kilograms CO_2e/MWh".
Fuel Emissions Factor	53.1 kg CO_2e/MMBtu (required default factor).
Units	Select "kilograms CO_2e/MMBtu".
Years for the Project	Enter 39.
Tree Mortality over Project Quantification Period, as an estimated percentage	Enter 0 (The Organics Benefits Calculator Tool will account for tree mortality).
Tree Planting Configuration #1 (Energy Savings from Tree Shade)	
Units	Select "English (feet & inches)".
Nomenclature	Choose "Common Name".
Species	Select "Apple" from the drop down menu.
DBH in Inches	Enter 1.5 inches as the starting DBH.
Distance to Nearest in Feet	Select "20-39" feet away.
Tree is _____ of Building	Select "West".
Vintage	Select "Built after 1980."
Climate Controls	Select "Heat & A/C."
Condition	Select "Excellent."
Exposure to Sunlight	Select "Full Sun."
Number of trees	Enter 2.
Tree Planting Configuration #2 (No Energy Savings)	
Units	Select "English (feet & inches)".
Nomenclature	Choose "Scientific Name".
Species	Select "Peach" from the drop down menu.
DBH in Inches	Enter 1.5 inches as the starting DBH.
Distance to Nearest in Feet	Select ">60" feet away.
Tree is _____ of Building	Leave at default ("North").
Vintage	Leave at default ("Built after 1980").
Climate Controls	Select "None"
Condition	Select "Excellent."
Exposure to Sunlight	Select "Full Sun."
Number of Trees	Enter 2.
Planting Report	
Units	English (pounds & tons; kWh & MMBtu; gallons).

See Figures 22 through 29 for a series of screenshots of how the input data should be entered into i-Tree Planting and the Organics Benefits Calculator Tool. Please note that the fuel saved by the project is usually a negative value, due to shaded building heating requirement increases during the winter (Figure 26).

Figure 22. Location Information

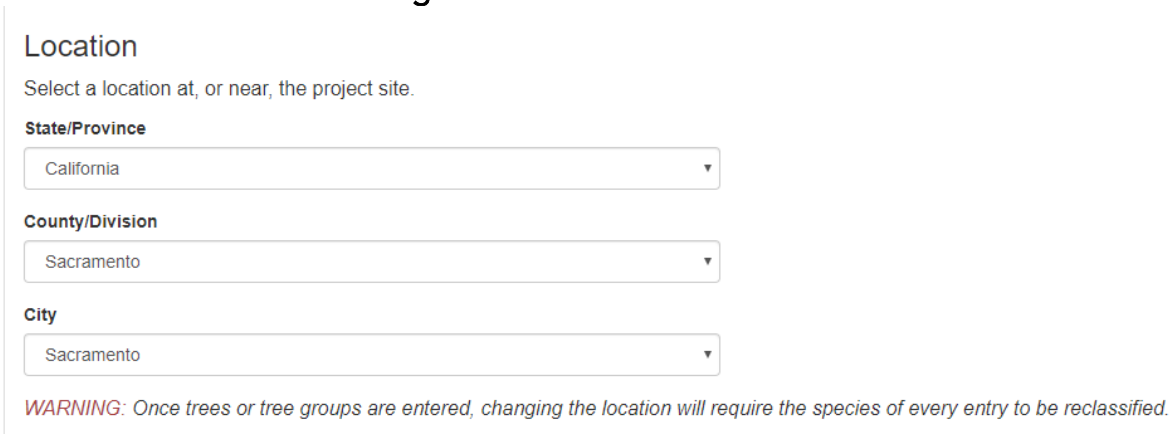


Figure 23. Project Parameters

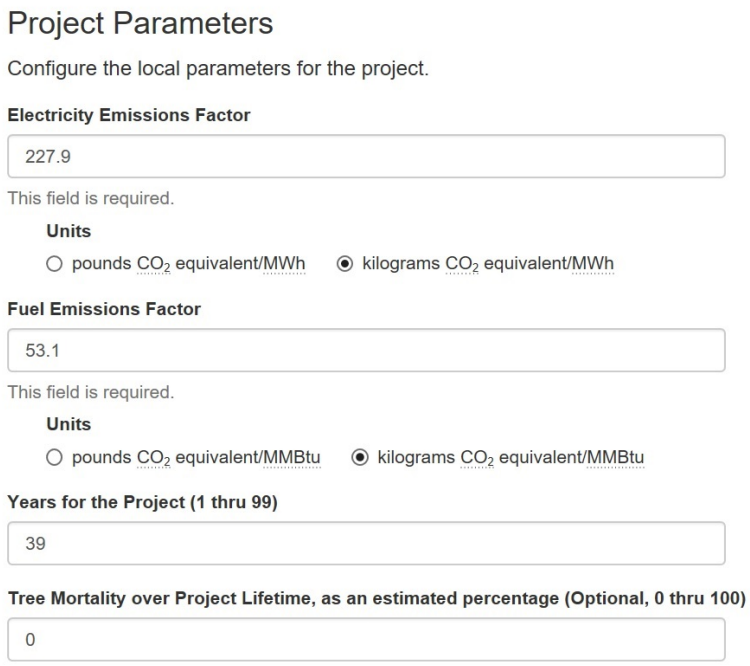
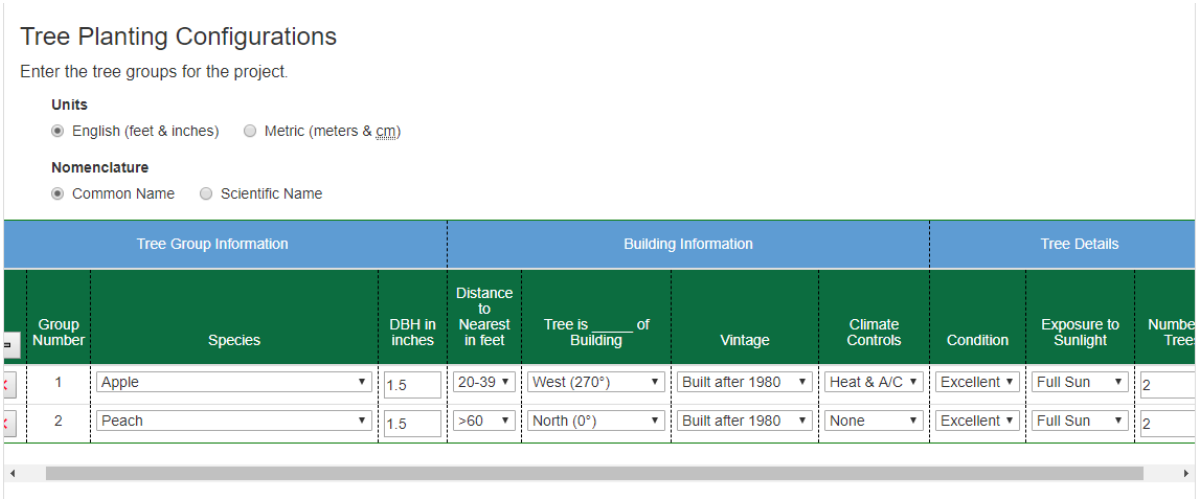


Figure 24. Tree Planting Configurations



Tree Planting Configurations

Enter the tree groups for the project.

Units

(•) English (feet & inches) ( ) Metric (meters & cm)

Nomenclature

(•) Common Name ( ) Scientific Name

Tree Group Information				Building Information				Tree Details		
Group Number	Species	DBH in inches	Distance to Nearest in feet	Tree is _____ of Building	Vintage	Climate Controls	Condition	Exposure to Sunlight	Numbe Tree
1	Apple	1.5	20-39	West (270°)	Built after 1980	Heat & A/C	Excellent	Full Sun	2
2	Peach	1.5	>60	North (0°)	Built after 1980	None	Excellent	Full Sun	2

Figure 25. i-Tree Planting Carbon Benefits

Location		CO_2 Benefits			
Group Identifier	Tree Group Characteristics	CO_2 Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
1	• (2) Apple (Malus species) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	2,657.9	$61.81	50,742.1	$1,180.11
2	• (2) Peach (Prunus persica) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	0.0	$0.00	572.6	$13.32

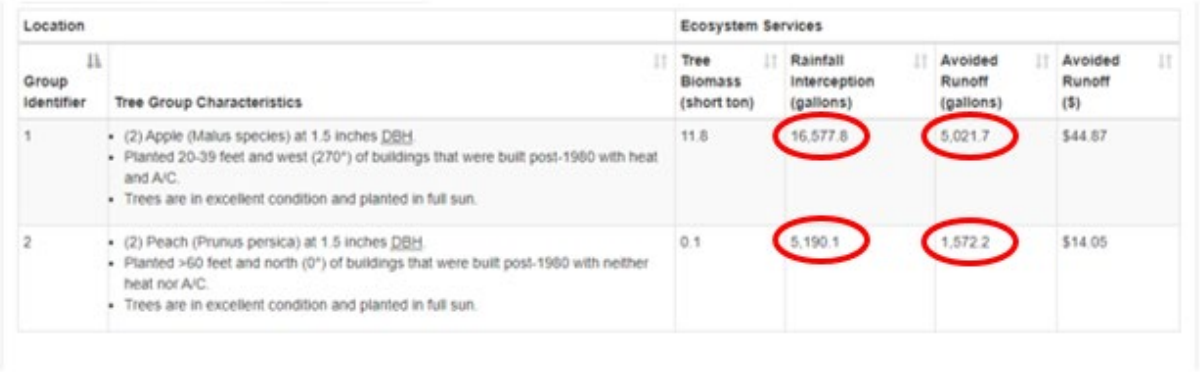
Figure 26. i-Tree Planting Energy Benefits

Location		Energy Benefits			
Group Identifier	Tree Group Characteristics	Electricity Saved (kWh)	Electricity Saved ($)	Fuel Saved (MMBtu)	Fuel Saved ($)
1	• (2) Apple (Malus species) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	5,939.7	$917.89	-5.3	$-59.97
2	• (2) Peach (Prunus persica) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	0.0	$0.00	0.0	$0.00

Figure 27. i-Tree Planting Air Pollution Benefits

Location		Air Benefits							
Group Identifier	Tree Group Characteristics	O_3 Removed (pounds)	NO_2 Avoided (pounds)	NO_2 Removed (pounds)	SO_2 Avoided (pounds)	SO_2 Removed (pounds)	VOC Avoided (pounds)	$PM_{2.5}$ Avoided (pounds)	$PM_{2.5}$ Removed (pounds)
1	• (2) Apple (Malus species) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	50.6	0.2	4.9	0.8	0.1	2.9	1.9	0.8
2	• (2) Peach (Prunus persica) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	14.9	0.0	1.4	0.0	0.0	0.0	0.0	0.2

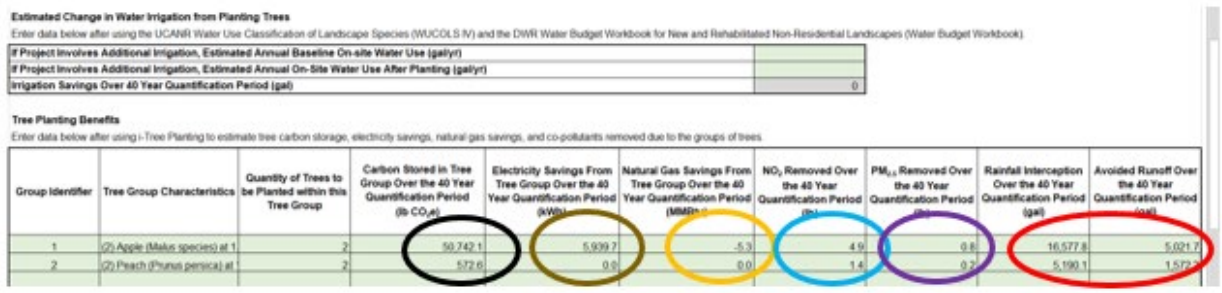
Figure 28. i-Tree Planting Water Savings



Location		Ecosystem Services			
Group Identifier	Tree Group Characteristics	Tree Biomass (short ton)	Rainfall Interception (gallons)	Avoided Runoff (gallons)	Avoided Runoff ($)
1	• (2) Apple (Malus species) at 1.5 inches DBH. • Planted 20-39 feet and west (270°) of buildings that were built post-1980 with heat and A/C. • Trees are in excellent condition and planted in full sun.	11.8	16,577.8	5,021.7	$44.87
2	• (2) Peach (Prunus persica) at 1.5 inches DBH. • Planted >60 feet and north (0°) of buildings that were built post-1980 with neither heat nor A/C. • Trees are in excellent condition and planted in full sun.	0.1	5,190.1	1,572.2	$14.05

Once all the outputs from i-Tree Planting are collected (circled values from Figures 25 through 28), they need to be input into the "Tree Planting" Tab of the Organics calculator as shown below in Figure 29. Enter in the Group Identifier and Tree Group Characteristics from i-Tree Planting and the number of trees in that group.

Figure 29. Organics Calculator Inputs: Tree Planting Worksheet



Estimated Change in Water Irrigation from Planting Trees

Enter data below after using the UCANR Water Use Classification of Landscape Species (WUCOLS IV) and the DWR Water Budget Workbook for New and Rehabilitated Non-Residential Landscapes (Water Budget Workbook)

If Project Involves Additional Irrigation, Estimated Annual Baseline On-site Water Use (gal/yr)	
If Project Involves Additional Irrigation, Estimated Annual On-Site Water Use After Planting (gal/yr)	
Irrigation Savings Over 40 Year Quantification Period (gal)	0

Tree Planting Benefits

Enter data below after using i-Tree Planting to estimate tree carbon storage, electricity savings, natural gas savings, and co-pollutants removed due to the groups of trees

Group Identifier	Tree Group Characteristics	Quantity of Trees to be Planted within this Tree Group	Carbon Stored in Tree Group Over the 40 Year Quantification Period (lb CO_2e)	Electricity Savings From Tree Group Over the 40 Year Quantification Period (kWh)	Natural Gas Savings From Tree Group Over the 40 Year Quantification Period (MMBtu)	NO_x Removed Over the 40 Year Quantification Period (lb)	$PM_{2.5}$ Removed Over the 40 Year Quantification Period (lb)	Rainfall Interception Over the 40 Year Quantification Period (gal)	Avoided Runoff Over the 40 Year Quantification Period (gal)
1	(2) Apple (Malus species) at 1	2	50,742.1	5,939.7	-5.3	4.9	0.8	16,577.8	5,021.7
2	(2) Peach (Prunus persica) at	2	572.6	0.0	0.0	1.4	0.2	5,190.1	1,572.3

Project Summary Tabs

Project reporting metrics and a summary of the overall project GHG emission reductions, air pollutant emission co-benefits, and key variables are provided on the "GHG Summary" and "Co-benefit Summary" tabs.

Project Information		
Project Name		Sacramento Garden
Total Organics GGRF Funds Requested ($)	$	50,000
Other GGRF Leveraged Funds ($)	$	-
Non-GGRF Leveraged Funds ($)	$	-
Total Funds ($)	$	50,000

GHG Summary		
Total Organics Grant GHG Emission Reductions ($MTCO_2e$)		44
Total GHG Emission Reductions ($MTCO_2e$)		44
Total GHG Emission Reductions per Total Organics Grant GGRF Funds ($MTCO_2e$/$)		0.000886
Total GHG Emission Reductions per Total Funds ($MTCO_2e$/$)		0.000886
Total Organics Grant GGRF Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$	1,128.91
Total Funds per Total GHG Emission Reductions ($/$MTCO_2e$)	$	1,128.91

Figure 30. Example Project #4 – GHG Summary tab outputs

Fuel and energy co-benefits

Fossil fuel use reductions (onsite reductions) over Quantification Period	0	gallons*	Note: Positive values indicate reductions, while negative values indicate increases
Fossil fuel use reductions (onsite reductions) over Quantification Period	4,655	kWh	Note: Positive values indicate reductions, while negative values indicate increases
Fossil fuel use reductions (onsite reductions) over Quantification Period	-42	therms	
Energy and fuel cost savings (onsite) over Quantification Period	$614	dollars	Note: Positive values indicate cost savings, while negative values indicate cost increases
Renewable fuel generation over Quantification Period	0	gallons*	
Renewable fuel generation over Quantification Period	0	scf	
Renewable energy generation over Quantification Period	0	kWh	

*diesel gallons equivalent

Air pollutant co-benefits	local	remote	total	
ROG Emission Reductions over Quantification Period	0	7	7	lbs
NOx Emission Reductions over Quantification Period	5	2	7	lbs
PM2.5 Emission Reductions over Quantification Period	1	1	2	lbs
Diesel PM Emission Reductions over Quantification Period	0	0	0	lbs

Soil health co-benefits

Compost production	0	Dry tons
Compost application area	0	Acres to be treated with compost soil ammendments
Trees Planted	4	Trees
Water savings	22,228	Gallons

Note: Positive values indicate compost production, while negative values indicate reductions in compost production

Waste reduction co-benefits

Edible Food Rescued & Donated	0	Tons
Source Reduction of Food Waste	0	Tons
Material Diverted from Landfill	123	Tons
Reduction in Vehicle Miles Traveled	0	Miles

Figure 31. Example Project #4 – Co-benefit Summary tab outputs

Submit Documentation

To complete the quantification process, the applicant must submit an electronic copy of the calculator (in .xlsx) and all the required documentation as noted in Section C of this Quantification Methodology.