California Air Resources Board

Greenhouse Gas Quantification Methodology for the

Strategic Growth Council

Sustainable Agricultural Land Conservation Program

Agricultural Conservation Easements

Greenhouse Gas Reduction Fund

Fiscal Year 2014-15

June 5, 2015

Table of Contents

A. Introduction

The California Air Resources Board (ARB) is responsible for providing the quantification methodology to estimate greenhouse gas (GHG) emission reductions from projects receiving monies from the Greenhouse Gas Reduction Fund (GGRF). For the Strategic Growth Council's (SGC) Sustainable Agricultural Land Conservation (SALC) Program, implemented by the Department of Conservation (DOC), ARB staff developed this GHG emission quantification methodology to be used to estimate the avoided GHG emissions from the proposed projects for Fiscal Year (FY) 2014-15 funds.

The quantification methodology uses specific components of the "California Emissions Estimator Model" (CalEEMod) tool to estimate the change in vehicle miles traveled (VMT) and GHG emissions based on the specific land use characteristics from the proposed easement project.

Methodology Development

For the first year (FY 2014-15) of the SALC Program, ARB and SGC/DOC staff followed a set of principles to guide the development of the quantification methodology.

These principles ensure that the methodology for SALC projects would:
- Apply at the project-level.
- Provide uniform methods to be applied statewide.
- Use existing and proven tools or methodologies where available.
- Reflect relationships between VMT and GHG reductions that are supported by empirical literature.

CalEEMod fits these principles, and provides a uniform methodology to quantify avoided VMT and GHG emissions from individual project proposals based on established modeling techniques.

Tool

CalEEMod is a "state-of-the-practice" land use emissions calculator tool designed to quantify GHG emissions and criteria air pollutants associated with land use development projects. It is used by municipal lead agencies to evaluate the GHG emissions and criteria air pollutants of land use development projects pursuant to California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), and for compliance with local air quality rules and regulations.

The tool is used statewide, publicly available, and is subject to regular updates to incorporate new information. It is free of charge and available to anyone with internet access. The tool uses on-road vehicle GHG emission factors from the ARB Mobile-Source Emission Factor model (EMFAC 2011), and provides an accurate method for quantifying air quality impacts from land use and transportation projects throughout California.

SALC Projects and Avoided GHG Emissions

The SALC Program will provide funding to leverage the protection of strategically located, highly productive, and critically threatened agricultural land, via permanent easements. This quantification methodology is only applicable for the Agricultural Conservation Easements (easements) portion of the SALC Program. The permanent protection via easements of farm and ranch lands result in the extinguishment of development rights which prevents increases in GHG emissions by limiting opportunities for expansive, vehicle dependent forms of development. This methodology assumes one development right is equivalent to a single family dwelling unit when estimating the avoided VMT and GHG emissions from a proposed easement project.

SGC/DOC will estimate the total avoided GHG emissions[1] from the proposed easement project for the duration of the project life, as defined in the methodology. SGC/DOC will report results as:

$$\frac{Total\ Project\ GHG\ Emission\ Reductions\ in\ Metric\ tons\ (MT)\ of\ CO2\ over\ the\ Project\ Life}{GGRF\ Funds\ Requested\ (\$)}$$

The following sections describe the calculations needed to estimate the avoided GHG emissions from a proposed easement under the FY 2014-15 SALC Program.

---

[1] This methodology results in estimated CO2 emissions only. For the purposes of this quantification methodology and the easement application, SGC/DOC will report CO2 emissions as GHG emissions.

B.   Quantification Methodology

The SALC Program will utilize CalEEMod to estimate the avoided GHG emissions associated with proposed easement projects. The CalEEMod model, User's Guide and other supporting documents can be downloaded, without charge, from www.caleemod.com.

CalEEMod combines project specific data with default data to establish an emissions estimate of a development project on the proposed easement project site. CalEEMod emissions output is the estimated GHG emissions that are avoided in lieu of the development project. For consistency with SGC's Affordable Housing and Sustainable Communities (AHSC) Program, the SALC Program's avoided emissions are quantified for a project life of 30 years.

Please Note: This FY 2014-15 quantification methodology focuses on land use characteristics that are included within CalEEMod. This methodology **does not** use the CalEEMod input or output screens for calculating construction, energy, and water-related emissions.

SGC/DOC will follow these steps to estimate the GHG emission reductions for a proposed easement project using CalEEMod.

1. **Define the Agricultural Conservation Easement (Easement) Scenario**: Use CalEEMod's "Project Characteristics" and "Land Use" screens as well as some defined default values for specific data inputs provided below to define a proposed easement scenario. The easement scenario is defined as the conservative estimate of development that could have occurred if the development rights were not extinguished.

2. **Generate a CalEEMod Easement Report**: Use CalEEMod's "Reporting" screen to generate an output file that will automatically calculate the estimated GHG emissions from the conservative estimate of development at the proposed easement project site.

3. **Step 3: Save Generated Reports:** Complete Step 1 and Step 2 twice. First, use the year the easement is anticipated (e.g., 2016) for year one (Yr1) to derive Yr1 GHG emissions. Second, use the year 2035 as a proxy for the final operational year (YrF) to derive YrF GHG emissions since it is the latest available operational year in CalEEMod.

4. **Calculate the Avoided GHG Emissions**: Calculate the avoided GHG emissions over the 30 year project life using results from Step 1 and Step 2.

Step 1: Define the Agricultural Conservation Easement (Easement) Scenario

Project Characteristics Screen

Cascade Defaults: Leave this box checked
Project Name: Enter project name
Project Location: Select the county*
(Windspeed and Precipitation will "autofill")
Climate Zone: Enter Climate Zone[2]

Land Use Setting: Select "Rural" or
"Urban" as defined by
census tract
Operational Year: First run, enter
year (Yr1).
Second run, enter 2035 for the final year (YrF).
Select Utility Co.: Select the utility company serving the proposed project.[3]
(CO2, CH4, and N2O Intensity Factors will "autofill")
Pollutants: Leave only the box for "Carbon Dioxide (CO2)" checked.

Land Use Screen

Cascade Defaults: Leave this box checked
Land Use Type: Select "Residential"
Subtype: Select "Single Family
Housing"
Unit Amount: Enter number of units
(equal to the number of
extinguished development
rights for the easement)
Size Metric: Select "Dwelling Unit"
Lot Acreage: Leave default values
Square Feet: Leave default values
Population: Leave default values

*For counties that are divided between air districts, air basins or district requested subregions; select the sub-county area which best represents the project location.

Navigation Note - After entering project information on the "Land Use Screen," navigate to the "Reporting" area of CalEEMod. The "Construction," "Operational," "Mitigation," and "Vegetation" areas of CalEEMod should not be used for project quantification.

---

[2] The Climate Zone is identified by zip code in the lookup table found here:
http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixf.pdf

[3] If utility company is not listed, use statewide average.

Step 2: Generate a CalEEMod Easement Report

Reporting Screen

Select "Annual" emissions

Click "Recalculate Emissions and Run Report"

CalEEMod will generate a report that includes the Agricultural Conservation Easement scenario, which is identified as "unmitigated" in the CalEEMod report. Unmitigated refers to the estimated emissions from a conservative estimate of development that could have occurred at the proposed easement project site.
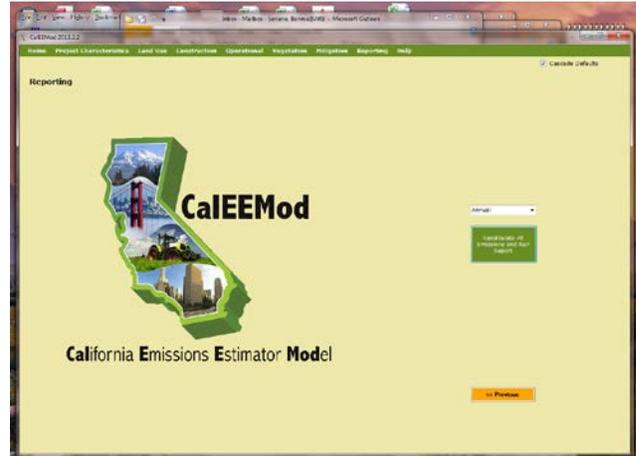
The GHG emissions value is found in Section 2.2 Overall Operational Unmitigated Operational in the Total CO2 column in the "Mobile" Category. Figure 1 below provides an example of an unmitigated, initial case results table.

Figure 1. CalEEMod Report Section 2.2 Listing Overall Operational Mobile Unmitigated (i.e., Easement scenario) GHG Emissions in MTCO2/yr.

Step 3: Save Generated Reports

The report generated from the first run provides the easement GHG emissions for the first operational year of the proposed easement project (Yr1 GHG Emissions). The report generated from the second run provides the easement GHG emissions in 2035 (YrF GHG Emissions). Save the two values Yr1 GHG emissions and YrF GHG emissions.

Step 4: Calculate the Avoided GHG Emissions

Calculate the estimated "avoided GHG emissions over the project life" using the results from Steps 1 & 2 and the following equation:

$$= \left(\frac{Yr1\ GHG\ emissions + YrF\ GHG\ emissions}{2} \right) * 30$$

The estimate of avoided GHG emissions over the project life will be used in Section C. Reporting and Documentation.

C. Reporting and Documentation

The final step to complete this quantification methodology is to report the estimated avoided GHG emissions and provide documentation of the calculations.

SGC/DOC will report results as:

$$\frac{Total\ Project\ GHG\ Emission\ Reductions\ in\ Metric\ tons\ (MT)\ of\ CO2\ over\ the\ Project\ Life}{GGRF\ Funds\ Requested\ (\$)}$$

Documentation

SGC/DOC is required to provide electronic documentation that is complete, and sufficient enough to allow the quantification calculations to be reviewed and replicated. Paper copies of any materials supporting the GHG emission estimates must be available upon request by ARB staff.

Documentation will include such things as:
- Contact information for the person who can answer project specific questions from staff reviewers on the quantification calculations
- Project description, including excerpts or specific references to the location in the main SALC application of the project information necessary to complete the applicable portions of the quantification methodology
- Electronic copies of the CalEEMod input and output files
- Summary page with, at minimum, the following information
  - o GHG emission estimates for Yr1 and YrF
  - o Total estimate of avoided GHG emissions over the project life
  - o GGRF funds requested for the project
- Estimated avoided GHG emissions per GGRF funds requested

For more information on ARB's efforts to support implementation of GGRF investments, see: www.arb.ca.gov/auctionproceeds. Questions on this document should be forwarded to GGRFProgram@arb.ca.gov.