

# SMAQMD Tips for Using CalEEMod



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## **Introduction**

The California Emission Estimator Model (CalEEMod) is a statewide model that assists project proponents, land use jurisdictions (lead agencies), consultants, and air districts in complying with the California Environmental Quality Act (CEQA) by estimating emissions of criteria pollutant and greenhouse gas emissions from land use development projects. Prior to approving a project, a lead agency is required by CEQA to determine if the project will have an impact on the environment, including air quality, and require appropriate mitigation for those impacts. CalEEMod is intuitive and the User's Guide is well documented. The installation files, User's Guide, User's Tips, and other supporting documents can be downloaded free of charge from the CalEEMod website: [www.caleemod.com](http://www.caleemod.com).

SMAQMD staff developed these *SMAQMD Tips for Using CalEEMod* to guide users through critical components of the model for projects within the boundaries of Sacramento County, including its cities. Following each tip is the information source: "CalEEMod" refers to a user tip from the CalEEMod website published November 2017; "SMAQMD" refers to a Sacramento-specific tip that SMAQMD developed. The tips are organized by the main CalEEMod screen sections.

## **General Information**

1. If the following error message "*Unexpected error from external database driver (1)*" appears when importing and saving an Excel file as .xls, you are not using the most current/recent version of CalEEMod. To fix this error, users need to fully uninstall CalEEMod and install version 2016.3.2.25 which is available from the Download Model tab of [www.caleemod.com](http://www.caleemod.com). (Source: CalEEMod User Tips #49)
2. The Project Characteristics and Land Use screens are the minimum required inputs for the model to calculate project emissions. SMAQMD encourages project specific information be entered if available. (Source: SMAQMD)
3. CalEEMod is linear. Unless the "cascade default" box is unchecked, changing data in earlier screens will trigger the software to apply the defaults related to the new data throughout the rest of the program. (Source: CalEEMod User Tips #2)
4. If the "cascade default" box is unchecked, no default values will be populated in subsequent screens. Unless all the necessary input parameters required for a proper analysis are known, it is recommended the user runs the model at least once with "cascade default" box checked to allow the defaults to be populated. Then, if the user would like to change project parameters (e.g., number of dwelling units, building square footage, etc.) without cascading new defaults in later screens, then uncheck the "cascade default" box when in the land use screen. Similarly, if the user wants to preserve the 'user defined' defaults already inputted (either by hand or .xls file) and run the model with different project parameters, un-check the "cascade default" box. (Source: CalEEMod User Tips #3)
5. Users who want to open/review/print a report from a previously saved file, the following is the easiest protocol to retain the changes to the CalEEMod defaults that are saved in the file: a) open the file, b) uncheck the "cascade defaults" check box in the upper right hand,

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- c) review any tab of interest in any order and/or run any of the project reports. (Source: CalEEMod User Tips #4)
  6. The user must activate cells by clicking on the cell or using the tab key to activate the next cell. The next cell will not be activated by the enter key. (Source: CalEEMod User Tips #6)
  7. The Template to "Import csv" Data and Defaults file (found under User's Guide at [www.caleemod.com](http://www.caleemod.com)) provides the necessary header row and dropdown lists of input characteristics down to row 100. If using this spreadsheet, be sure to delete any unused lines down to row 100 so the program does not take the time to process blank cells. (Source: CalEEMod User Tips #7)
  8. The "Remarks" box is limited to 255 characters due to the current capabilities of the software, so users are advised to be efficient in justifying the modification and, if necessary, provide additional wording for reviewers (e.g., see attachment for further clarification). (Source: CalEEMod User Tips #8)
  9. When exiting the "Project Characteristics" screen to the "next" screen, dropdown boxes will temporarily show the first item on the dropdown lists. The model did not change the user's input selection. This is a result of the programming but the input provided by the user will not change to that first listed item that flashed before the next screen appears. (Source: CalEEMod User Tips #9)

### ***Project Characteristics***

10. Select County and Sacramento from the project location drop down lists. (Source: SMAQMD)
11. Choose the climate zone by looking up the zip code or city/county name for the project. The most common zone for Sacramento County is 6, but some areas are in zones 2, 3 or 4. There is a look-up button to assist. (Source: SMAQMD)
12. Use the urban setting if the project is located within the County's Urban Services Boundary (USB) otherwise use the rural setting. The USB map is available on the County of Sacramento's website: <http://www.per.saccounty.net/Pages/PlanningandCommunityMaps.aspx>. (Source: SMAQMD)
13. Select a start of construction date to reset the default start date on the Construction Phase screen. Check that the construction timing coincides with the operational year selected for the project. (Source: SMAQMD)
14. Operational years in the model include 2000, 2005, 2010-2035, 2040, 2045 and 2050. The model will round down to the nearest year and use that data if a year not specifically listed in the drop down list is entered. (SMAQMD)
15. Select Sacramento Municipal Utility District for the utility provider. (Source: SMAQMD)
16. Provide SMAQMD with the rationale supporting energy intensity factors used that are different than the default. (Source: SMAQMD)

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## **Land Use**

17. Recreational land uses of City Park, Golf Course, and Recreational Swimming Pool requires users to input building spaces, so that: 1) the green land of City Park and Golf Course and pool surface area of Recreational Swimming Pool are excluded from the calculation of ROG from architectural coating; 2) the green land of City Park and Golf Course and pool surface area of Recreational Swimming Pool are excluded from the calculation of ROG from general consumer products; 3) the green land of City Park and Gold Course is included in the calculation of ROG from pesticides/fertilizers. (Source: CalEEMod User Tips #14)
18. If identifying a "User Defined" land use, the user will need to supply the necessary input data because the defaults are not provided in the "User Defined" options. (Source: CalEEMod User Tips #10)
19. Non-residential land uses with parking will require the user to select a parking land use subtype (e.g., parking lot, parking structure, other asphalt surfaces, or other non-asphalt surfaces). Off-gassing emissions from paving of parking lots and other asphalt surfaces are calculated for the project construction period. A parking structure or other non-asphalt surfaces are assumed to be concrete with no off-gassing. (Source: CalEEMod User Tips #12)
20. The square footage of a land use is used for certain calculations such as determining the wall space to be painted (e.g., ROG emissions from architectural coatings) and volume of space that is heated or cooled (e.g., energy impacts). The acreage is used to determine the amount of ground to be prepared, graded, paved, etc. If the land uses are being constructed in a mixed use setting (e.g., multi-storied), the acreage should be assigned to the residential or split between non-residential land uses if there is no residential land use. (Source: CalEEMod User Tips #13)
21. For commercial uses, the building size square footage should be entered into the model not the lot size. (Source: SMAQMD)

## **Construction**

22. The parking land use type is excluded from the ROG calculations for non-residential interior/exterior architectural coatings, but is included in the ROG calculations for parking lot paint. (Source: CalEEMod User Tips #26)
23. The model requires at least one construction phase be selected in order for the model to calculate project emissions. If the user is not interested in the construction emission results, the user can delete all but one construction phase and zero out the default number of equipment and trip lengths. (Source: CalEEMod User Tips #15)
24. If a "construction only" project is desired, the user needs to enter the following land uses at a minimum to ensure proper calculation of defaults: 1) Other Asphalt Surfaces - specify the correct acreage of asphalt for off-gassing emissions; 2) User Defined Residential and User Defined Commercial - specify the correct building square footage for

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- architectural coating emissions; and, 3) ensure the total acreage at the bottom of the land use screen is accurate as this is the basis for the default construction schedule and equipment list. (Source: CalEEMod User Tips #16)
- 25.If modifying the construction dates in the input excel spreadsheet be sure to use the format of 4-digit year/2-digit month/2-digit day. (Source: CalEEMod User Tips #17)
  - 26.If loading a different construction schedule (i.e., with .xls or .csv file), the model is unable to revert back to the original default schedule. (Source: CalEEMod User Tips #18)
  - 27.If loading an incorrect construction schedule (e.g., construction ends before it starts), the model will reset the construction phase dates to original defaults. The error can be fixed by changing the construction schedule in a separate input file (such as an .xls or .csv file) and then loading that new input file into the model. (Source: CalEEMod User Tips #19)
  - 28.The default equipment list and construction schedule is only valid for 35-acre and smaller projects that have buildings of no more than 4 stories tall. Otherwise, the proponent must provide project specific information. (Source: SMAQMD)
  - 29.For construction equipment calculations, the user should evaluate whether the default equipment list, including equipment types and numbers, horsepower ratings, hours of operation, and duration of phases, are appropriate. If changes are made to the equipment list, the program will neither automatically compensate by changing the construction time nor automatically revise the equipment list to reflect a revised construction time. Changes to one of these must accompany revisions of the other based on project-specific data. (Source: CalEEMod User Tips #20)
  - 30.A general rule for construction equipment is that if the construction schedule is shortened by  $\frac{1}{2}$ , the number of equipment needs to be doubled. (Source: SMAQMD)
  - 31.When modifying off-road construction equipment types, users are recommended to either add or modify the number of units. If an equipment type is not being used, change the number of units to zero and do not delete the equipment type. The reason for this recommendation is that the model will reinsert a default equipment type if deleted and calculate emissions based on original default values. However, the emissions from that equipment will be zero if a zero number of units are identified. (Source: CalEEMod User Tips #21)
  - 32.Changing the off-road equipment on the construction screen does not automatically load the horsepower (HP) or load factor for the modified equipment type. The user needs to click the "default" button in order to load the appropriate default HP and load factor data. The user may also input non-default HP and load factor values as well but would be required to provide a justification of the new input data in the "Remarks" box at the bottom of the screen. (Source: CalEEMod User Tips #22)
  - 33.If changing the off-road equipment default HP to a value higher than the ranges listed in Table 3.4 of Appendix D in the User's Guide (generated from CARB's off-road inventory) the construction emissions will be zero. The user is recommended to stay within the ranges provided in Table 3.4 to calculate associated emissions. A programming modification will be considered in a future upgrade. (Source: CalEEMod User Tips #23)
  - 34.Water truck(s) used during construction were counted in the vendor trip survey that was conducted for all the phases of construction (e.g., site preparation, grading, building construction, etc.). The vehicle count factor (vehicles per unit/square foot) was based on

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an average of the construction projects surveyed, and vendor trips calculated for the whole construction project are listed under the Building Construction phase. However, the user may manually enter any additional vehicles (on the Construction – Trips and VMT screen) under any construction phase to highlight the inclusion in the analysis. (Source: CalEEMod User Tips #24)

35. Non-default values for unpaved roads during construction are not being transferred further in the model thus the mitigated emissions for on-road fugitive dust are not listed correctly in the report. To ensure correct mitigated emissions, the user is recommended to select one of the mitigation options on the 'construction mitigation' tab and then de-select it (if you do not have any mitigation) and the report will come out correct. (Source: CalEEMod User Tips #25)
36. The default construction data does not include material haul amounts or demolition or trenching phase information. Enter project specific information if the project includes these activities. If concrete truck trips in phases other than Building Construction need to be captured, the user can enter that information in the Construction - Trips and VMT screen. (Source: SMAQMD)

### ***Operational***

37. For a City Park, Golf Course, or Recreational Swimming Pool land use: 1) the greenspace portion of a City Park or Golf Course land use is excluded from the ROG calculations for architectural coatings and consumer products but is included in the ROG calculations for pesticide/fertilizer use; and, 2) the pool surface area portion of a Recreational Swimming Pool land use is excluded from the ROG calculations for architectural coatings and consumer products. (Source: CalEEMod User Tips #36)
38. The parking land use type is excluded from the ROG calculations for non-residential interior/exterior architectural coatings, but is included in the ROG calculations for parking lot paint. (Source: CalEEMod User Tips #37)
39. If the project will have unpaved roads during the operational phase, select the CARB Unmitigated Unpaved Road Statewide Emission Inventory Method option for calculating particulate matter emissions for unpaved road dust. (Source: SMAQMD)
40. Trip rates reflect the vehicle activity related to a type of land use. Default residential trip rates for condos and mid- and high-rise apartments are the same as low-rise apartments, which is the baseline scenario (suburban area) from the CAPCOA GHG mitigation measure of increased diversity of urban and suburban development (mixed use). Thus, when the user applies the mitigation measure of increased diversity, the appropriate reduction in VMT will be calculated. (Source: CalEEMod User Tips #27)
41. Units of the operational vehicle emission factors (on the Operational-Mobile screen, Vehicle Emissions tab) are not listed because they vary depending on the action. For example, running exhaust and evaporative running loss emissions are in grams per vehicle mile traveled (VMT) and start-up, idling, and all other evaporative emissions are in grams per trip. (Source: CalEEMod User Tips #28)

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42. To eliminate the emissions from a specific vehicle class category, the user can zero out the emission factors (on Operational-Mobile screen, Vehicle Emissions tab). (Source: CalEEMod User Tips #29)
  43. Consult with SMAQMD before modifying any vehicle emissions factors. (Source: SMAQMD)
  44. Consult with SMAQMD before modifying the fleet mix. (Source: SMAQMD)
  45. For Sacramento County, the model assumes no hearths are included in residential projects. If the project includes hearths, modify the inputs and mitigate excess emissions. SMAQMD's Rule 417 regulates hearth installations. (Source: SMAQMD)
  46. If reducing the ROG content of architectural coatings during operation, the model will not transfer those new values to the area mitigation screen, but will highlight the boxes in yellow to alert the user the operational VOC content limits are different. If the user does not modify the VOC content limit on the mitigation screen to reflect the changed values in the operational phase, the report will list the default value as a new value under mitigation. However, the model will not calculate a mitigated value unless the box next to the architectural coating is checked on the area mitigation screen. (Source: CalEEMod User Tips #32)
  47. The percentage of wastewater treatment (i.e., septic, aerobic, or lagoons) should not exceed 100 percent and the waste digestion (i.e., anaerobic digestion with cogeneration or not) should total either 100 percent or zero percent. If wastewater treatment is aerobic or lagoon, there needs to be digestion to handle the waste, so digestion should total 100 percent. If the wastewater treatment is septic, digestion could be zero percent. A reminder box is triggered if input is incorrect. (Source: CalEEMod User Tips #34)
  48. The wastewater treatment method defaults represent the Sacramento Regional County Sanitation District wastewater treatment plant. If the project is not served by this plant, consult with the lead agency to determine the appropriate wastewater treatment types and percentages. (Source: SMAQMD)
  49. If the information is known, override the default landfill gas capture types on the Solid Waste screen with the type of system employed at the landfill that will serve the project. (Source: SMAQMD)
  50. Users are cautioned when assigning a percent of landfill types used by the project to "Landfill Capture Gas Energy Recover" as CO<sub>2</sub>e emissions are being calculated and reported as unreasonable high. This item will be corrected in a future upgrade. (Source: CalEEMod User Tips #35)
  51. Consult with SMAQMD before using the stationary sources screens. (Source: SMAQMD)

### **Mitigation**

52. Alternative fuel options (e.g., CNG, bio-diesel) are provided for each construction equipment type. It is the responsibility of the lead agency to ensure the equipment operated by the project actually uses alternative fuel. (Source: CalEEMod User Tips #39)

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53. CNG equipment available for mitigation is restricted to those equipment and horsepower ranges listed in Table 3.6 of Appendix D. If CNG is selected for a non-valid piece of equipment, emissions for this will not be quantified. (Source: CalEEMod User Tips #40)
54. Construction equipment types from all construction phases are combined on the mitigation screen; thus, the user's ability to apply different mitigation measures to the same types of equipment is limited. For example, if the user wishes to apply diesel particulate filter mitigation to several dozers, and apply biodiesel fuel mitigation to several other dozers, this option is not available. However, the model will read separate mitigation from the same equipment type from an import CSV (excel spreadsheet) if modified to reflect the same equipment type and different mitigation. (Source: CalEEMod User Tips #41)
55. The emission rates for the off-road equipment used during construction are based on statewide fleet mix from CARB's off-road inventory model per year and HP range (Table 3.4 in Appendix D of the User's Guide). Tiered engine emission factors (Table 3.5 in Appendix D of the User's Guide) are based on Carl Moyer standards to qualify for a particular tier that may be chosen to mitigate engine emissions. In some instances, the statewide fleet mix average for a particular equipment type, year, and HP may be lower than the engine tier standard generating higher mitigated emissions. The user should use caution in choosing the appropriate tier mitigation so mitigation is occurring. (Source: CalEEMod User Tips #42)
56. Select a "project setting" type on the Mitigation, Traffic, Land Use & Site Enhancement screen for the reductions from selected mitigation measures to be calculated properly. (Source: SMAQMD)
57. The project setting descriptions under the Traffic mitigation have been defined in the CAPCOA Quantifying GHG Mitigation Measures document (<http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>) except Suburban is called Low Density Suburban in the model and Compact Infill is called Urban Center in the model. (Source CalEEMod User Tips #43)
58. SMAQMD's *Recommended Guidance for Land Use Emission Reductions* (<http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation>) provides guidance on mitigation measures that can be used in CalEEMod and the requirements that must be met to obtain credit for the selected measures. (Source: SMAQMD)
59. Users are cautioned when checking Neighborhood Electric Vehicle as GHG mitigation because VMT reduction has not been demonstrated in the report. (Source: CalEEMod User Tips #44)

### **Reports**

60. The user can modify the excel report to get mini-headers on each page by using the page set up function and choosing to repeat the top 3 lines, and then add a header – centered to show "page 1 of ?" in the place of the "Page 1 of 1" that is currently showing on the 1<sup>st</sup> page of the Excel report. (Source: CalEEMod User Tips #48)

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61. The output report provides either peak daily emissions from summer or winter emission factors, or annual emissions. For projects located in the San Luis Obispo APCD, the highest quarterly value of ROG + NO<sub>x</sub> during construction has been added to the Annual report. For projects located in other air districts, quarterly emissions results are not provided but can be calculated by multiplying the peak daily by 90 days (i.e., one quarter of year), or dividing the annual by four (i.e., one quarter of year). (Source: CalEEMod User Tips #46)
62. An "Unhandled Exception" error message blocks the user's ability to view the report. The error is caused by an incorrect input data. For example, this will occur if a mitigation input value is outside the allowable range of reductions (as outlined in CAPCOA's Quantifying GHG Mitigation Measures document) or the input is zero when model expects a positive integer. (Source: CalEEMod User Tips #45)
63. The output report for Vegetation identifies the CO<sub>2</sub>e emissions reductions (or increases) in units of metric tons, not metric tons per year. To ascertain the annual amount of emissions, the user should divide the total metric tons by the anticipated life of the project. (Source: CalEEMod User Tips #47)
64. Provide the CalEEMod input files and the summer, winter and annual reports for each model run conducted for a project for SMAQMD review. (Source: SMAQMD)

Questions on CalEEMod can be directed to the SMAQMD staff in the following table for projects being analyzed in Sacramento County and its incorporated cities.

<b>STAFF</b>	<b>PHONE</b>	<b>E-MAIL</b>	<b>AREAS</b>
<b>Paul Philley</b>	916-874-4882	pphilley@airquality.org	CEQA and Land Use Section Program Supervisor
<b>Joanne Chan</b>	916-874-6267	jchan@airquality.org	County of Sacramento, City of Elk Grove
<b>Teri Duarte</b>	916-874-4816	tduarte@airquality.org	City of Sacramento
<b>Rachel Dubose</b>	916-874-4876	rdubose@airquality.org	County of Sacramento, City of Citrus Heights
<b>J.J. Hurley</b>	916-874-2694	jhurley@airquality.org	Cities of Sacramento and Folsom
<b>Karen Huss</b>	916-874-4881	khuss@airquality.org	City of Galt
<b>Molly Wright</b>	916-874-4207	mwright@airquality.org	City of Rancho Cordova

For users who experience operation system errors, send an email with screenshots to [CalEEMod\\_TechSupport@trinityconsultants.com](mailto:CalEEMod_TechSupport@trinityconsultants.com).

Model questions and suggestions should be reported to [inquiry@caleemod.com](mailto:inquiry@caleemod.com).

A state-wide air district working group meets regularly to discuss necessary CalEEMod updates.