



# California Emission Estimator Model (CalEEMod<sup>®</sup>) Update Workshop



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**Diamond Bar, California**  
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# What CalEEMod<sup>®</sup> Does



- Quantifies criteria pollutants, GHG emissions
- Applies to 68 land use subcategories
- Applies approved emission factors, established methodology, latest survey data
- Statewide model – all 35 air districts
- Calculates for air district, county, air basin, state
- Calculates emissions from construction/operation/area
- Calculates direct and indirect GHG emissions (*e.g., energy use, water/wastewater use, solid waste disposal, and vegetation planting and/or removal*)
- Calculates benefits from mitigation measures

# Use and Functionality



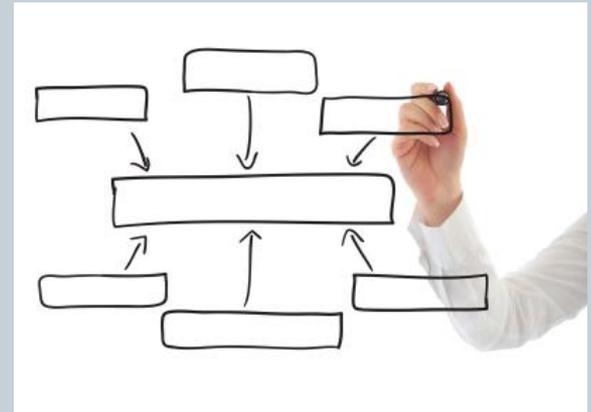
- Variety of applications – specific project, mixed use, plans, inventory, *user defined* land uses
- Statewide users include:
  - ✓ environmental consultants
  - ✓ city and county planners
  - ✓ air quality districts
  - ✓ CEQA/NEPA document reviewers
  - ✓ developers
  - ✓ decision-makers
- Flexibility in usage
  - ✓ defaults allow minimal amount of required input
  - ✓ provides ability to insert spreadsheet for large projects (e.g., construction schedule, construction equipment list)



# History



- ✓ First version released to the public in Spring 2011
- ✓ Thousands of download across the state
- ✓ Majority air districts and local governments recommending, if not requiring, usage for air quality analysis
- ✓ Ownership transferred to CAPCOA; copyright approved
- ✓ Needed an upgrade once EMFAC 2011 was released (Dec 2011)
- ✓ Modifications took 21-month period to prepare and test
- ✓ Extensive beta-testing with air districts, consultants, local gov
- ✓ Released 2013.2 in July 2013
- ✓ Two revisions since (Sept, Oct 2013)



# Major Upgrades



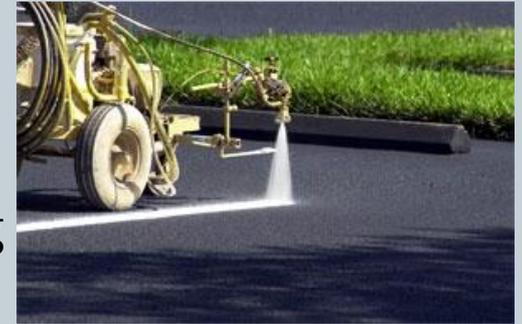
- ✓ Incorporation of latest AP-42 EFs for paved roads, CARB's EMFAC2011, and updated 2011 off-road inventory
- ✓ Update platform, optimize code (*speed has improved 60%*)
- ✓ Correct re-loading problems with construction dates/equipment
- ✓ New “cascade default” button will save time; improve user efficiency
- ✓ Calculate emissions from off-road equipment during operation
- ✓ Calculate energy from elevators/lighting/ventilation from parking land uses
- ✓ Update utility carbon intensity values



# Additional Upgrades



- ✓ New water/solid waste defaults for industrial land uses
- ✓ Allow user to change architectural ctg sq footage
- ✓ Modify VOC calculation from parking lot painting
- ✓ Modify wastewater treatment methodology
- ✓ Add CAPCOA mitigation number to GHG mitigation measures screens
- ✓ Re-format report (& include more input data)
- ✓ Provide new separate mitigation report



# Supporting Documentation Updates



- List of Specific Revisions (2013.2, 2013.2.1, 2013.2.2)
- User's Guide
  - ✓ Main document
    - Improved descriptions and explanations
    - Updated screen shots
  - ✓ Appendix A – Calculation details/methodologies
  - ✓ Appendix D – Default data
  - ✓ Appendix E – Technical source documentation
  - ✓ Appendix F – Climate Zones
- User's Tips



# Current Status



- Online training segments to be produced
- Website - [www.caleemod.com](http://www.caleemod.com):
  - ✓ Modeling files (*latest version and 2011.1.1 during transition*)
  - ✓ User's Guide/User's Tips
  - ✓ List of Specific Revisions
  - ✓ FAQs
  - ✓ Subscriber sign-up
  - ✓ Upcoming events



# Future Upgrade Ideas



- ❑ CARB's 2014 EMFAC update
- ❑ Construction study
- ❑ Method to start construction schedule
- ❑ 9<sup>th</sup> edition ITE trip rates
- ❑ 2013 update to Title 24 (part 6)
- ❑ Option to calculate *only* construction or *only* operation
- ❑ GHG emissions from water, waste, electricity use during construction
- ❑ More off-road (e.g., ships and trains)
- ❑ Stationary sources (e.g., ICEs, boilers, sump pumps)
- ❑ Individual HHDT category emission factors
- ❑ Water use from cleaning solar panels, energy from blow torching process in applying parking coatings, etc.
- ❑ More sequestration categories (e.g., biological habitat)
- ❑ Future CAPCOA updates to mitigation document

# New option to not populate defaults

CalEEMod.2013.2.2

Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

## Project Characteristics

### Project Detail

Project Name: Valentine St. Apartments

Project Location: Air District (dropdown), South Coast AQMD (dropdown)

Windspeed (m/s): County (dropdown), Air Basin (dropdown), Air District (dropdown), Statewide (dropdown)

Precipitation Frequency (days): Statewide (dropdown)

Climate Zone: 11 (dropdown)

Land Use Setting: Urban (dropdown)

Operational Year: 2015 (dropdown)

### Utility Information

\*If "User Defined" is selected, user must specify data source in Remarks

Select Utility Company: Los Angeles Department of Water & Power (dropdown)

CO2 Intensity Factor (lb/MWh): 1,227.89

CH4 Intensity Factor (lb/MWh): 0.029

N2O Intensity Factor (lb/MWh): 0.00617

### Remarks

Empty text box for remarks.

### Pollutants

Import csv

Default

Undo

Select All

Clear All

Pollutant Selection	Pollutant Full Name
<input checked="" type="checkbox"/>	Reactive Organic Gases (ROG)
<input checked="" type="checkbox"/>	Nitrogen Oxides (NOx)
<input checked="" type="checkbox"/>	Carbon Monoxide (CO)
<input checked="" type="checkbox"/>	Sulfur Dioxide (SO2)
<input checked="" type="checkbox"/>	Particulate Matter 10um (PM10)
<input checked="" type="checkbox"/>	Particulate Matter 2.5um (PM2.5)
<input checked="" type="checkbox"/>	Fugitive PM10um (PM10)
<input checked="" type="checkbox"/>	Fugitive PM2.5um (PM2.5)
<input checked="" type="checkbox"/>	Biogenic Carbon Dioxide (CO2)
<input checked="" type="checkbox"/>	Non-Biogenic Carbon Dioxide (CO2)
<input checked="" type="checkbox"/>	Carbon Dioxide (CO2)
<input checked="" type="checkbox"/>	Methane (CH4)
<input checked="" type="checkbox"/>	Nitrous Oxide (N2O)
<input checked="" type="checkbox"/>	CO2 Equivalent GHGs (CO2e)

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# New Parking Subtypes – energy impacts

CalEEMod.2013.2.2



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Cascade Defaults

## Land Use



Import csv

Default

Undo

	Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage	Square Feet	Population
	Residential	Apartments Mid Rise	120	Dwelling Unit	3.16	120,000	343
	Retail	Supermarket	25	1000sqft	0.57	25,000	0
▶	Parking	Enclosed Parking Structure					
*		Enclosed Parking Structure					
		Enclosed Parking with Elevator					
		Other Asphalt Surfaces					
		Other Non-Asphalt Surfaces					
		Parking Lot					
		Unenclosed Parking Structure					
		Unenclosed Parking with Elevator					
		User Defined Parking					

Population

Lot Acreage

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Remarks

# Providing option to change the sq ft of architectural coatings

CalEEMod.2013.2.2

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Cascade Defaults

## Construction

Construction Phase | Off-Road Equipment | Dust from Material Movement | Demolition | Trips And VMT | On-Road Fugitive Dust | Architectural Coatings

Import csv

Default

Undo

Phase Name	Residential Interior VOC (g/L)	Residential Interior Area (sqft)	Residential Exterior VOC (g/L)	Residential Exterior Area (sqft)	Non Residential Interior VOC (g/L)	Non Residential Interior Area (sqft)	Non Residential Exterior VOC (g/L)	Non Residential Exterior Area (sqft)
Architectural Coating	50	150,000	100	81,000	250	97,500	250	32,500

Remarks

Half the walls are pre-fabricated and pre-painted, thus lowering the residential square foot to coat.

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# Calculating emissions from off-road equipment during operation

CalEEMod.2013.2.2



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Cascade Defaults

## Operational - Off-Road Equipment

[Import csv](#) [Default](#) [Undo](#)

	Equipment Type	Number of Equipment	Hours/Day	Days/Year	HorsePower (HP)	Load Factor	Fuel Type
* *	Aerial Lifts	0	8	260			Diesel

- Aerial Lifts
- Air Compressors
- Bore/Drill Rigs
- Cement and Mortar Mixers
- Concrete/Industrial Saws
- Cranes
- Crawler Tractors
- Crushing/Proc. Equipment
- Dumpers/Tenders
- Excavators
- Forklifts
- Generator Sets
- Graders
- Off-Highway Tractors
- Off-Highway Trucks
- Other Construction Equipment
- Other General Industrial Equipment
- Other Material Handling Equipment
- Pavers
- Paving Equipment
- Plate Compactors
- Pressure Washers
- Pumps
- Rollers
- Rough Terrain Forklifts
- Rubber Tired Dozers
- Rubber Tired Loaders
- Remo
- Scrapers
- Signal Boards
- Skid Steer Loaders

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# “No Change” default for Construction Mitigation

CalEEMod.2013.2.2

Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

## Mitigation

Construction Traffic Area Energy Water Solid Waste

### Off-Road Equipment

[C-1]

Import csv

Default

Undo

Equipment Type	Fuel Type	Engine Tier	Number Of Equipments	Total Number Of Offroad	DPF Level	Using Oxidation Catalyst
Air Compressors	Diesel	No Change	No Change	0	1 No Change	0
Cement and Mortar Mixers	Diesel	No Change		0	2 No Change	0
Concrete/Industrial Saws	Diesel	No Change		0	1 No Change	0
Cranes	Diesel	No Change		0	1 No Change	0
Excavators	Diesel	No Change		0	4 No Change	0
Forklifts	Diesel	No Change		0	3 No Change	0
Generator Sets	Diesel	No Change		0	1 No Change	0

### Fugitive Dust

Soil Stabilizer for Unpaved Roads

PM10 (% Reduction)

PM2.5 (% Reduction)

Replace Ground Cover of Area Disturbed

PM10 (% Reduction)

PM2.5 (% Reduction)

Water Exposed Area

Frequency (per day)

PM10 (% Reduction)

PM2.5 (% Reduction)

Unpaved Road Mitigation

Moisture Content (%)

Vehicle Speed (mph)

Clean Paved Road

% PM Reduction

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

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Remarks

# Identifying CAPCOA GHG mitigation measure number for easy reference

CalEEMod.2013.2.2

Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

## Mitigation

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

Project Setting

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks" box should contain percent reduction justification.

Import csv

### Land Use

- Increase Density [LUT-1]  Dwelling Units/acre  
 Jobs/Job acre
- Increase Diversity [LUT-3]
- Improve Walkability Design [LUT-9]  
Intersections/Square Miles
- Improve Destination Accessibility [LUT-4]  
Distance to Dwntrwn/Job Ctr (Miles)
- Increase Transit Accessibility [LUT-5]  
Distance to Transit Station (Miles)
- Integrate Below Market Rate Housing [LUT-6]  
#Dwelling Units Below Market Rate

### Parking Policy/Pricing

- Limit Parking Supply [PDT-1]  
% Reduction in Spaces
- Unbundle Parking Costs [PDT-2]  
Monthly Parking Cost (\$)
- On-Street Market Pricing [PDT-3]  
% Increase in Price

### Transit Improvement

- Provide BRT System [TST-1]  
% Lines BRT
- Expand Transit Network [TST-3]  
% Increase Transit Coverage
- Increase Transit Frequency [TST-4]  
Level of Implementation   
% Reduction in Headways

### Neighborhood Enhancements

- Improve Pedestrian Network [SDT-1]
- Provide Traffic Calming Measures [SDT-2]  
% Streets with Improvement
- Implement NEV Network [SDT-3]

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Remarks

# Contact Information



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