



California Emission Estimator Model (CalEEMod[®]) 2016



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CAPCOA Update
August 31, 2016

CalEEMod[®] 2016.3.1 Status



- CAPCOA CalEEMod Focus Group meets monthly
 - Comprised of representatives from 8 air pollution control agencies
- Current upgrade action items for version 2016.3.1
 - 28 programming/coding efforts
 - 5 changes to the reporting
- 2016.3.1 Beta released for testing
 - January 2016 - Focus Group Only
 - June 2016 - Focus Group & Power Users
 - 55 Power Users from 38 organizations were invited
 - Received comments from 10 Power Users

Top 10 Upgrades



1. CARB's 2014 EMFAC & Off-Road Source Categories
2. 2013 update Title 24, Part 6 - Building Efficiency % reduction
3. ITE trip rates from 9th edition Trip Generation Manual
4. New "Fleet Mix" tab per land use type (Operational Mobile)
5. New "Start of Construction" box to trigger construction calendar
6. Update Global Warming Potentials per IPCC's 4th Assessment
7. New Stationary Sources during Operation (e.g., generators, boilers, fire pumps)
8. Fixed GHG Mitigation Measures
9. Exclude open spaces (e.g., city parks, golf courses, recreational swimming pools, and parking lots/garages) from consumer products and architectural coating (VOC) calculations
10. New Unpaved Road Dust calculation option for SLOAPCD/SMAQMD

1. EMFAC 2014/OFFROAD Update



CalEEMod.2016.3.1

Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

Operational - Mobile

Vehicle Trips Vehicle Emissions Fleet Mix Road Dust

Annual Summer Winter

Import csv Default Undo

Emission Type	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SRUS	MH
FleetMix	0.552649	0.047166	0.188709	0.133983	0.020046	0.005542	0.012942	0.007976	0.001135	0.000641	0.024108	0.000655	0.004452
CH4_IDLEX	0	0	0	0	0.006643	0.004992	0.017477	0.875305	0.013005	0	0	0.882229	0
CH4_RUNEX	0.007304	0.020666	0.009717	0.018469	0.017075	0.007668	0.01258	0.084682	0.013436	2.976725	0.485003	0.017843	0.046488
CH4_STREX	0.009216	0.022846	0.011136	0.022855	0.025998	0.013909	0.069588	0.13465	0.035335	0.060058	0.154562	0.082566	0.037879
CO_IDLEX	0	0	0	0	0.1616	0.138562	0.510086	3.317984	0.292823	0	0	7.421411	0
CO_RUNEX	0.853344	2.227667	1.122968	1.967703	1.258098	0.622697	0.873174	0.998843	0.907305	13.277888	20.2834	1.032855	4.652069
CO_STREX	1.724545	4.217513	2.164036	3.775053	3.466725	1.92074	8.541506	3.423698	7.008232	10.928984	9.569174	8.083963	7.974177
CO2_NBIO_IDLEX	0	0	0	0	8.960392	13.672088	139.750...	5,009.3...	98.582206	0	0	1,189.2...	0
CO2_NBIO_RUNEX	308.311...	366.682...	419.101...	555.924...	636.866...	650.307...	1,152.7...	1,669.1...	1,267.3...	2,011.8...	180.128...	1,126.0...	1,121.3...
CO2_NBIO_STREX	64.949121	76.413643	88.111143	115.274...	36.777232	31.100771	65.266504	10.194559	70.960151	95.004548	46.670899	48.512	65.883148
NOX_IDLEX	0	0	0	0	0.071903	0.105827	1.159886	26.365056	0.641579	0	0	12.142714	0
NOX_RUNEX	0.074927	0.214023	0.122682	0.229036	1.635646	1.429568	2.915094	4.878118	2.322136	11.803776	1.134843	5.828853	1.612316
NOX_STREX	0.117893	0.251389	0.201396	0.367368	1.180698	0.745088	10.319533	19.76362	2.560122	15.878692	0.308905	13.447686	0.72109
PM10_IDLEX	0	0	0	0	0.00079	0.001185	0.004936	0.034256	0.000378	0	0	0.016512	0
PM10_PMBW	0.03675	0.03675	0.03675	0.03675	0.07644	0.08918	0.13034	0.060719	0.13034	0.624457	0.01178	0.7448	0.13034

2. 2013 Update to Title 24, Part 6



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Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

Operational - Energy Use

Using Historical Data

Import csv Default Undo

Land Use Subtype	Title-24 Electricity Energy Intensity (KWhr/size/yr)	Nontitle-24 Electricity Energy Intensity (KWhr/size/yr)	Lighting Energy Intensity (KWhr/size/yr)	Title-24 Natural Gas Energy Intensity (KBTU/size/yr)	Nontitle-24 Natural Gas Energy Intensity (KBTU/size/yr)
Convenience Market (24 Hour)	4.2	3.23	6.43	1.16	0.49
Gasoline/Service Station	2.36	5.75	3.2	13.71	4.45

3. Trip Rates from ITE 9th edition



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Cascade Defaults

Operational - Mobile

Vehicle Trips Vehicle Emissions Fleet Mix Road Dust

Import csv Default Undo

Land Use SubType	Size Metric	Wk Trip Rate (/size /day)	Sat Trip Rate (/size /day)	Sun Trip Rate (/size /day)	Res H-W Trip Length (miles)	Res H-S Trip Length (miles)	Res H-O Trip Length (miles)	Non Res C-C Trip Length (miles)	Non Res C-W Trip Length (miles)	Non Res C-NW Trip Length (miles)	Primary Trip (%)	Divert Trip (%)	Pass-B Trip (%)	Res H-W Trip (%)	Res H-S Trip (%)	Res H-O Trip (%)	Non Res C-C Trip (%)	Non Res C-W Trip (%)	Non Res C-NW Trip (%)
Convenience Market...	1000sqft	737.99	863.1	758.45	0	0	0	8.4	16.6	6.9	24	15	61	0	0	0	80.1	0.9	19
Gasoline/Service St...	Pump	168.56	168.56	168.56	0	0	0	8.4	16.6	6.9	14	27	59	0	0	0	79	2	19

4. New “Fleet Mix” Tab



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Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

Operational - Mobile

Vehicle Trips Vehicle Emissions **Fleet Mix** Road List

Import csv Default Undo

Land Use SubType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Convenience Market (24 Hour)	0.552648	0.047166	0.188709	0.133983	0.020046	0.005542	0.012942	0.007976	0.001135	0.000641	0.024108	0.000651	0.004452
Gasoline/Service Station	0.552648	0.047166	0.188709	0.133983	0.020046	0.005542	0.012942	0.007976	0.001135	0.000641	0.024108	0.000651	0.004452

5. New “Start of Construction” Box



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Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help

Cascade Defaults

Project Characteristics

Project Detail

Project Name: test_20160707

Project Location: Air District: South Coast AQMD

Windspeed (m/s): 2.2

Precipitation Frequency (days): 31

CEC Forecasting Climate Zone: 11

Land Use Setting: Urban

Start of Construction: Thursday, July 7, 2016

Operational Year: 2018

CEC Forecasting Climate Zone Look-up

To look up the CEC Forecasting Climate Zone for this project, click the orange button.

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)

Utility Information

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

Select Utility Company: Southern California Edison

CO2 Intensity Factor (lb/MWh): 702.44

CH4 Intensity Factor (lb/MWh): 0.029

6. Updated Global Warming Potentials



100-yr GWPs from the IPCC second assessment report (SAR) and fourth assessment report (AR4).
AR4 GWPs are used for the 2000-2014 emission inventory

Gas Name	Formula	Lifetime (years)	SAR GWP	AR4 GWP	Percent Change
Carbon Dioxide	CO ₂		1	1	
Methane	CH ₄	12	21	25	+19%
Nitrous Oxide	N ₂ O	114	310	298	-3.9%

7. New Stationary Sources During Operation



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Cascade Defaults

Operational - Stationary Sources

Emergency Generators and Fire Pumps Generators / Fire Pumps EF Process Boilers Boilers EF User Defined

Import csv Default Undo

Equipment Type	Number of Equipment	Fuel Type	Horsepower (HP)	Load Factor (0-1)	Hours/Day	Hours/Year	Equipment Description
Emergency Generator	1	CNG	100	0.73	1	50	Emergency Generator - CNG (0 - 5...
Fire Pump	1	Diesel	50	0.73	1	50	Fire Pump - Diesel (50 - 75 HP)

Emergency Generators and Fire Pumps Generators / Fire Pumps EF Process Boilers Boilers EF User Defined

Import csv Default Undo

Equipment Description	TOG E.F.	TOG E.F. Units	ROG E.F.	ROG E.F. Units	CO E.F.	CO E.F. Units	NOX E.F.	NOX E.F. Units	SO2 E.F.	SO2 E.F. Units	PM 10 E.F.	PM 10 E.F. Units	PM 2.5 E.F.	PM 2.5 E.F. Units	CO2 E.F.	CO2 E.F. Units	CH4 E.F.	CH4 E.F. Units
Emergency Generator - CNG ...	0.358	lb/M...	250	ppmv	2,000	ppmv	45	ppmv	0.0006	lb/M...	0.0095	lb/M...	0.0095	lb/M...	110	lb/M...	0.23	lb/M...
Fire Pump - Diesel (50 - 75 HP)	0.00...	lb/hp...	0.00...	lb/hp...	3.7	g/hp-hr	3.325	g/hp-hr	0.0049	g/hp-hr	0.3	g/hp-hr	0.3	g/hp-hr	1.15	lb/hp...	0.07...	g/hp-hr

8. Fixed GHG MM Calculations



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Cascade Defaults

Mitigation

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

Project Setting

Land Use

- Increase Density [LUT-1] Dwelling Units/acre
- Increase Diversity [LUT-3] Jobs/Job acre
- 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

Neighborhood Enhancements

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

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

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

9. Ability to Exclude Open Spaces From VOC Calculations

City Park/Golf Course Land Uses

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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
▶	Recreational	Golf Course	18	Hole	125.66	0	0
	Recreational	City Park	10	Acre	10	435,600	0
	Retail	Convenience Market (24 Hour)	2.1	1000sqft	0.05	2,100	0
	Retail	Gasoline/Service Station	6	Pump	0.02	847.05	0
*							

Population

Lot Acreage

City Park/Golf Course Building Area Square Feet

9. Ability to Exclude Open Spaces From VOC Calculations (concluded)

Recreational Swimming Pool Land Use

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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
▶	Recreational	Recreational Swimming Pool	20	1000sqft	0.46	20,000	0
*							

Population

Lot Acreage

Recreational Swimming Pool Building Area Square Feet

Previous Next

10. New Unpaved Road Dust Option



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Cascade Defaults

Operational - Mobile

Vehicle Trips Vehicle Emissions Fleet Mix Road Dust

Import csv Default Undo

Paved Road Dust

% Pave

Road Silt Loading (g/m2)

Average Vehicle Weight (tons)

Unpaved Road Dust

[AP-42's Equation 1b Method](#)

Material Silt Content (%)

Material Moisture Content (%)

Mean Vehicle Speed (mph)

CARB Unmitigated Unpaved Road Statewide Emission Inventory Method

Use CARB's 2.0 (lbs PM10/VMT) and 0.2 (lbs PM2.5/VMT)

Upgrades to Reports



1. New output summary reports present peak daily emissions on the Summer and Winter reports and present GHG summary on Annual report instead of displaying the sum of maximum daily emissions over the years.
2. New mini-headers/footers on Winter/Summer/Annual reports to indicate project name & type of report.
3. New highest quarterly value of ROG + NO_x during construction on Annual report for projects located in the San Luis Obispo APCD
4. “Paving Acres Disturbed” in the reports no longer defaults to zero.
5. Fixed formatting problem that places Section 4.4 (Fleet Mix) below the Fleet Mix table and atop the title in Section 5.0.

Other Upgrades/Fixes



1. Default horsepower (hp) determination based on weighted average of statewide operating activity for each off-road equipment type has been modified.
2. New reminder on fleet mix screen to alert the user that the total is in fractions if fleet mix exceeds 100%.
3. Solid waste landfill capture gas flare updated to 100% for Santa Barbara County APCD.
4. New electrical option added as an alternative to fuel on mitigation screen.
5. Fixed NO_x emissions calculation for when biodiesel B20 is selected as a fuel.
6. Re-labeled “Total Acres Disturbed” column (Dust from Material Movement screen) has to “Total Acres Graded.”
7. Changed units on “Consumer Products” screen “# ROG/sq ft/year” to “# ROG/sq ft/day.”
8. Fixed calculation of non-residential architectural coating VOC emissions when the user changes the exterior area to be painted.
9. Updated area source natural gas emission factors for CO, SO_x, NO_x and lead to align with EPA’s AP-42.

Other Upgrades/Fixes (concluded)



10. Arena trip type (%) now adds up to 100%.
11. Update reflects regional default data provided by the air districts/local MPOs (e.g., architectural coating VOC content limits, percentage of wastewater treatment, MPO information, number of snow days vs. summer days, waste treatment plant specific effluent nitrogen, etc.)
12. Fixed calculation of solid waste (landfill) GHG emissions when applying energy recovery.
13. GHG energy usage calculation for single family housing has been corrected.
14. Added City of Vernon to drop down list of utilities.
15. Updated CO2 intensity value for Southern California Edison utility.
16. Deleted box for entering a number next to the NEV network mitigation box.
17. Changed names of two air districts (e.g., El Dorado County APCD to El Dorado County AQMD and Monterey Unified APCD name to Monterey Bay Air Resources District).
18. Fixed other typos and spelling errors, etc.

Schedule



- Anticipate public release in September 2016
- Conduct local training events throughout California
- Exploring Webcast Training/Youtube options

Contact Information



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