PROJECT-LEVEL ASSESSMENTS

A&WMA Mother Lode Chapter

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What type of project-level assessments may need to be completed?

- CEQA Analysis
  - Maximum daily emissions
  - Constructions and operations *(separate thresholds)*
- General Conformity
  - Peak annual emissions
  - Constructions and operations *(cumulative)*
- Transportation Conformity
  - CO hot spots
  - PM10/2.5 hot spots

General conformity de minimis thresholds for Sacramento County

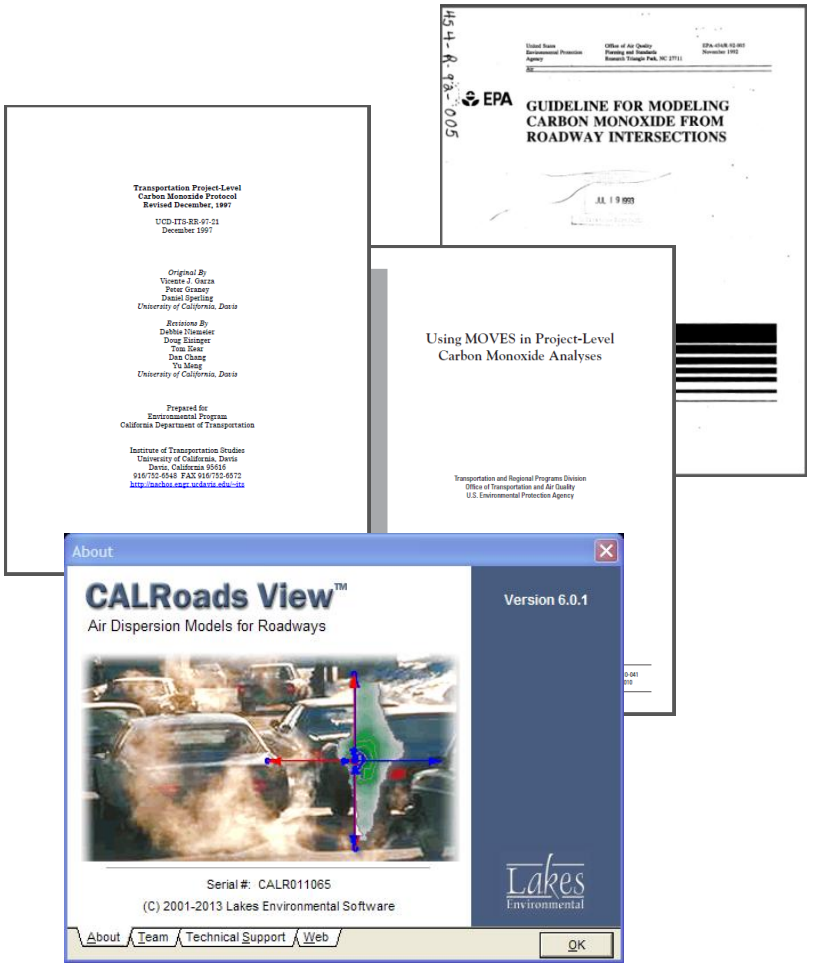
Pollutant	Federal Attainment Status	De Minimis Threshold (40 CFR 93.153)
VOC	Severe nonattainment (O_3 precursor)	25 tpy
NOx	Severe nonattainment (O_3 precursor)	25 tpy
PM10	Moderate nonattainment	100 tpy
PM2.5	Nonattainment	100 tpy
CO	Maintenance	100 tpy
SO_2	PM2.5 precursor	100 tpy

Source: EPA. 2013. The Green Book Nonattainment Areas for Criteria Pollutants. July 31. Available online at: http://www.epa.gov/airquality/greenbk/ [Last accessed in October 2013].

- Only applicable to projects with federal action
- Projects with emissions less than de minimis thresholds assumed to conform with state implementation plan (SIP)

What type of analysis is required for transportation conformity?

- CO hot spots analysis
  - Screening process available in the SMAQMD *CEQA Guidelines*
  - Follow UC Davis/Caltrans *CO Protocol* (1997) for all refined analyses
  - U.S. EPA guidance for MOVES2010b and CAL3QHC to be used for other states



What type of analysis is required for transportation conformity (continued)?

- PM10/2.5 hot spots
  - Generally only required for projects that result in a significant increase of diesel vehicles
  - Interagency consultation to confirm requirements

Type of Project	Recommended Model(s)
Highway and intersection projects	AERMOD, CAL3QHCR
Transit, freight, and other terminal projects	AERMOD
Projects that involve both highway/ intersections and terminals, and/or nearby sources	AERMOD

What methods are available to complete a project-level assessment?

Emission Factors

- CalEEMod
- EMFAC2011
- OFFROAD Database Models
- OFFROAD2007
- SMAQMD Roadway Construction Emissions Model
- MOVES2010b
- NONROAD2008a
- AP-42

Air Dispersion and Health Risk

- AERMOD
- CALPUFF
- EDMS
- HARP
- CAL3QHC/R
- CALINE4

Other methods / options are available!

How to determine what model/method to use to estimate emissions

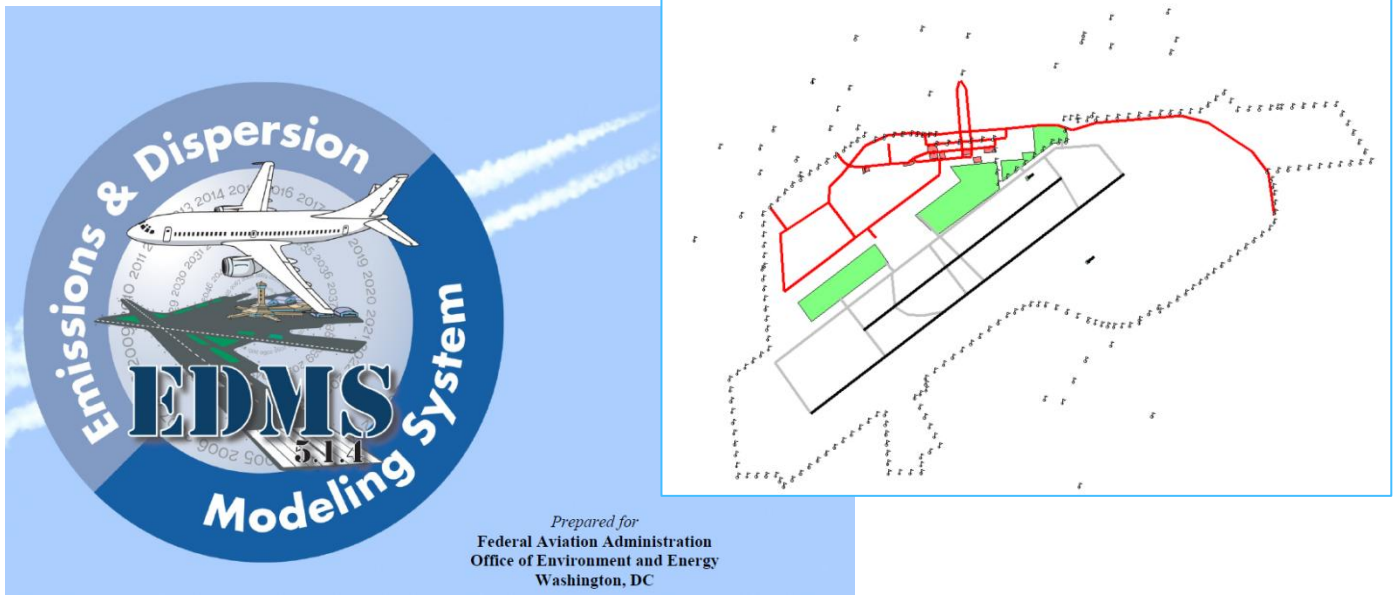
- How much information/data do I have?
- What level of environmental review (Initial Study, Environmental Impact Report, etc.) is required?
- How complex is the project?
- What are the possible emission sources (both construction and operations)?
- Where is it located (California or somewhere else)?
- What are the regulatory requirements (i.e., does an agency, like the FAA, require a specific model)?
- What is the attainment status of the region?
- Is there federal action?

What obstacles often need to be overcome in project-level analyses?

- Limited project information often available from project proponents
- Many agencies and project proponents are overworked and understaffed
- A combination of models/methods is often required to complete analysis
- Some equipment types not available in CalEEMod (airport ground support equipment)
- Is the government operating (e.g., are data and/or staff available)?

Regulatory requirements may dictate the tools to be used

- EDMS is the <u>required model</u> to perform air quality analyses for aviation sources



Regulatory requirements can present challenges (Case Study: EDMS)

- Ground support equipment (GSE), roadways, and parking lot parameters are not California-specific
- Model input files can be HUGE

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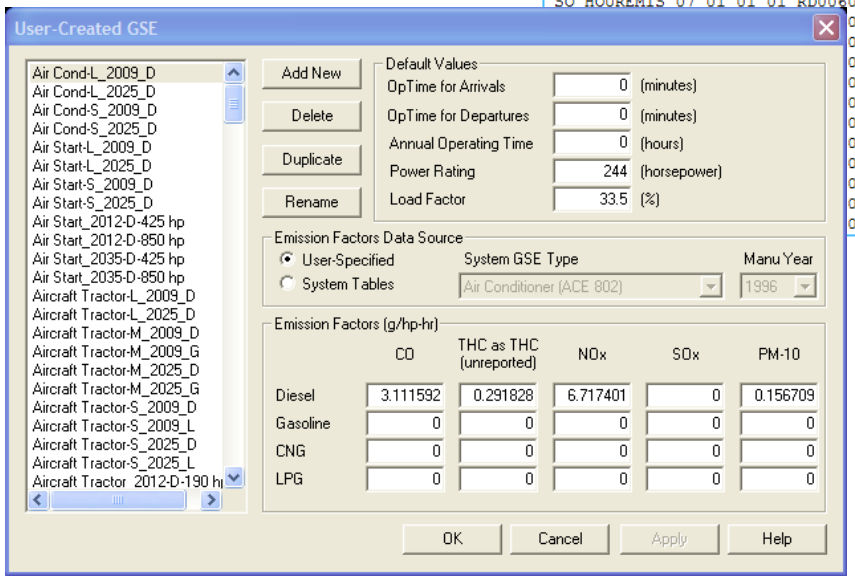
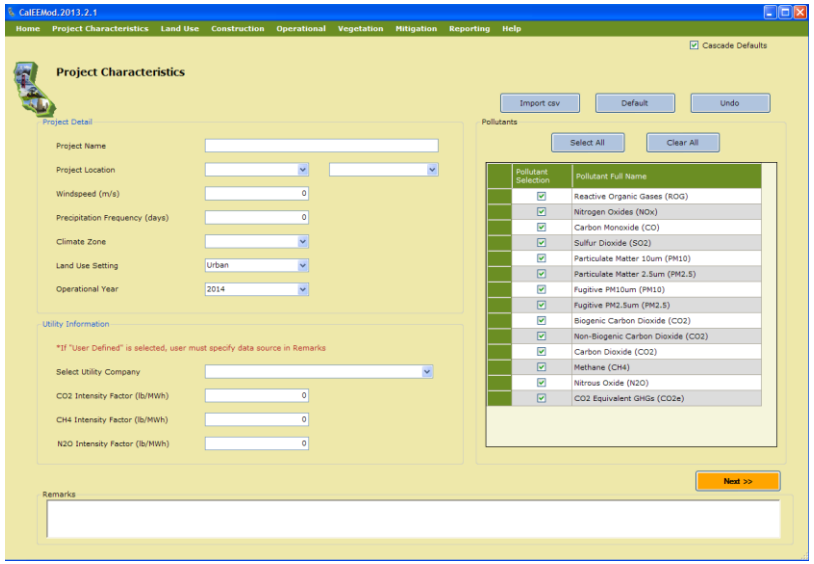


Projects with limited information can be handled simply

- **"The proposed project consists of a 64-unit mid-level apartment building with 100 parking places."**
  - Project is in the preliminary stages of analysis and an Initial Study/Mitigated Negative Declaration is being prepared.
  - Client is unable to provide specific project details.

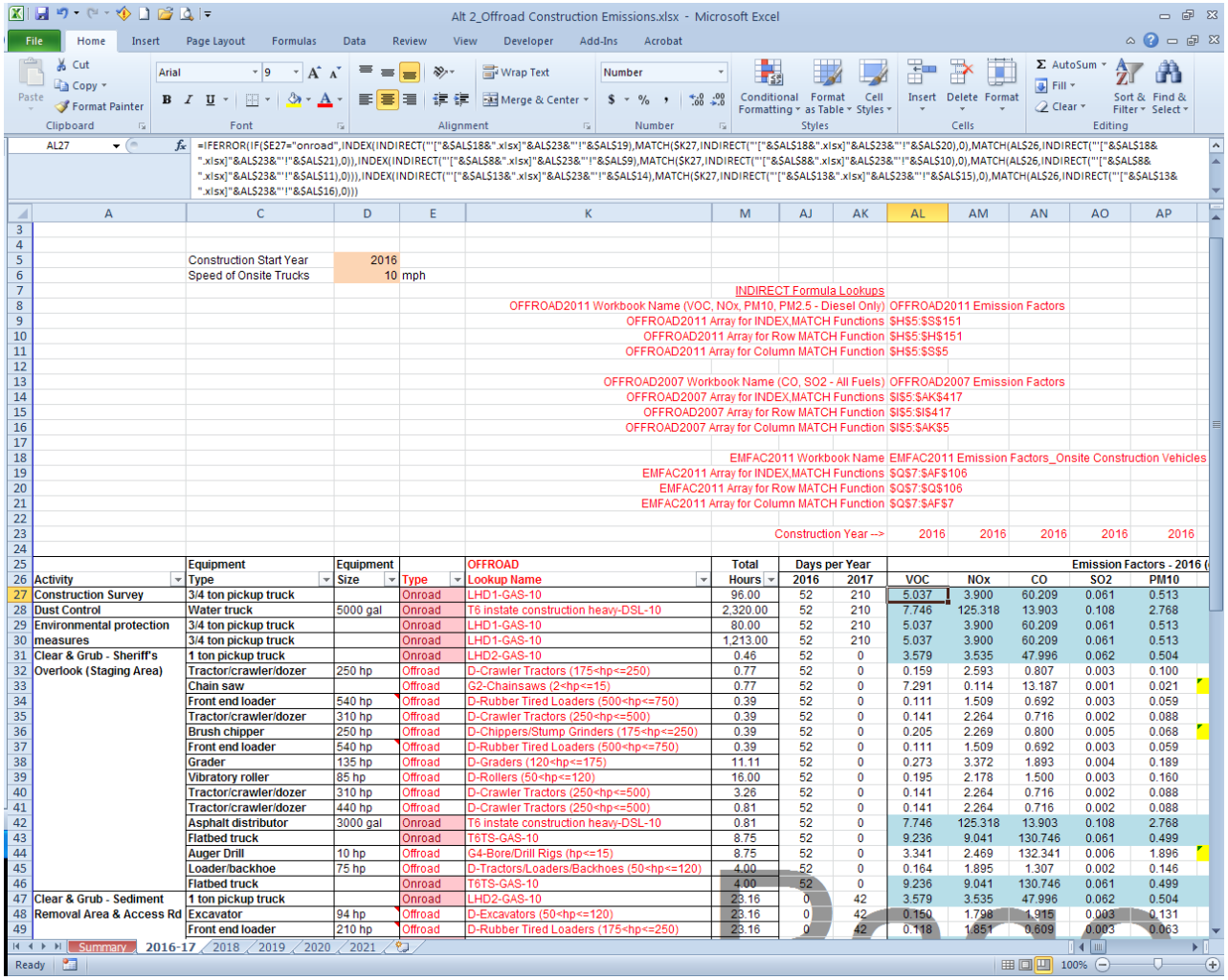
Use CalEEMod



When is CalEEMod not a good tool to use?

- Limited land use options
  - Often difficult to fit a project type (e.g., airport) to the available options
- Limited flexibility, especially for highly complex projects
- Current version (2013.2.2) is improved, but bugs and other issues can be problematic
- Often does not handle change well
  - Output reports are finicky
  - Changes to the input can destroy links/references to Excel output

Projects with detailed information require a complex analysis



Alt 2_Offroad Construction Emissions.xlsx - Microsoft Excel

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Construction Start Year	2016	
Speed of Onsite Trucks	10	mph

INDIRECT Formula Lookups

OFFROAD2011 Workbook Name (VOC, NOx, PM10, PM2.5 - Diesel Only)	OFFROAD2011 Emission Factors
OFFROAD2011 Array for INDEX,MATCH Functions	$H$5:$S$151
OFFROAD2011 Array for Row MATCH Function	$H$5:$H$151
OFFROAD2011 Array for Column MATCH Function	$H$5:$S$5
OFFROAD2007 Workbook Name (CO, SO2 - All Fuels)	OFFROAD2007 Emission Factors
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OFFROAD2007 Array for Row MATCH Function	$I$5:$I$417
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EMFAC2011 Workbook Name	EMFAC2011 Emission Factors_Onsite Construction Vehicles
EMFAC2011 Array for INDEX,MATCH Functions	$Q$7:$AF$106
EMFAC2011 Array for Row MATCH Function	$Q$7:$Q$106
EMFAC2011 Array for Column MATCH Function	$Q$7:$AF$7

					Construction Year -->			2016	2016	2016	2016	2016	
	Equipment	Equipment		OFFROAD	Total	Days per Year		Emission Factors - 2016 (					
Activity	Type	Size	Type	Lookup Name	Hours	2016	2017	VOC	NOx	CO	SO2	PM10	
Construction Survey	3/4 ton pickup truck		Onroad	LHD1-GAS-10	96.00	52	210	5.037	3.900	60.209	0.061	0.513	
Dust Control	Water truck	5000 gal	Onroad	T6 instate construction heavy-DSL-10	2,320.00	52	210	7.746	125.318	13.903	0.108	2.768	
Environmental protection	3/4 ton pickup truck		Onroad	LHD1-GAS-10	80.00	52	210	5.037	3.900	60.209	0.061	0.513	
measures	3/4 ton pickup truck		Onroad	LHD1-GAS-10	1,213.00	52	210	5.037	3.900	60.209	0.061	0.513	
Clear & Grub - Sheriff's	1 ton pickup truck		Onroad	LHD2-GAS-10	0.46	52	0	3.579	3.535	47.996	0.062	0.504	
Overlook (Staging Area)	Tractor/crawler/dozer	250 hp	Offroad	D-Crawler Tractors (175<hp<=250)	0.77	52	0	0.159	2.593	0.807	0.003	0.100	
	Chain saw		Offroad	G2-Chainsaws (2<hp<=15)	0.77	52	0	7.291	0.114	13.187	0.001	0.021	
	Front end loader	540 hp	Offroad	D-Rubber Tired Loaders (500<hp<=750)	0.39	52	0	0.111	1.509	0.692	0.003	0.059	
	Tractor/crawler/dozer	310 hp	Offroad	D-Crawler Tractors (250<hp<=500)	0.39	52	0	0.141	2.264	0.716	0.002	0.088	
	Brush chipper	250 hp	Offroad	D-Chippers/Stump Grinders (175<hp<=250)	0.39	52	0	0.205	2.269	0.800	0.005	0.068	
	Front end loader	540 hp	Offroad	D-Rubber Tired Loaders (500<hp<=750)	0.39	52	0	0.111	1.509	0.692	0.003	0.059	
	Grader	135 hp	Offroad	D-Graders (120<hp<=175)	11.11	52	0	0.273	3.372	1.893	0.004	0.189	
	Vibratory roller	85 hp	Offroad	D-Rollers (50<hp<=120)	16.00	52	0	0.195	2.178	1.500	0.003	0.160	
	Tractor/crawler/dozer	310 hp	Offroad	D-Crawler Tractors (250<hp<=500)	3.26	52	0	0.141	2.264	0.716	0.002	0.088	
	Tractor/crawler/dozer	440 hp	Offroad	D-Crawler Tractors (250<hp<=500)	0.81	52	0	0.141	2.264	0.716	0.002	0.088	
	Asphalt distributor	3000 gal	Onroad	T6 instate construction heavy-DSL-10	0.81	52	0	7.746	125.318	13.903	0.108	2.768	
	Flatbed truck		Onroad	T6TS-GAS-10	8.75	52	0	9.236	9.041	130.746	0.061	0.499	
	Auger Drill	10 hp	Offroad	G4-Bore/Drill Rigs (hp<=15)	8.75	52	0	3.341	2.469	132.341	0.006	1.896	
	Loader/backhoe	75 hp	Offroad	D-Tractors/Loaders/Backhoes (50<hp<=120)	4.00	52	0	0.164	1.895	1.307	0.002	0.146	
	Flatbed truck		Onroad	T6TS-GAS-10	4.00	52	0	9.236	9.041	130.746	0.061	0.499	
Clear & Grub - Sediment	1 ton pickup truck		Onroad	LHD2-GAS-10	23.16	0	42	3.579	3.535	47.996	0.062	0.504	
Removal Area & Access Rd	Excavator	94 hp	Offroad	D-Excavators (50<hp<=120)	23.16	0	42	0.150	1.798	1.915	0.003	0.131	
	Front end loader	210 hp	Offroad	D-Rubber Tired Loaders (175<hp<=250)	23.16	0	42	0.118	1.851	0.609	0.003	0.063	

Summary | 2016-17 | 2018 | 2019 | 2020 | 2021

Ready

Flexibility in Excel workbooks is essential to control variables

- **DO NOT HARD CODE DATA IF POSSIBLE!!**
- Key considerations in spreadsheet:
  - "Lookup column" created to lookup emission factors based on fuel type, OFFROAD model name, and horsepower size
  - **IF/THEN** statement written to lookup on- versus off-road emission factors
  - **INDEX/MATCH** statement written to lookup equipment type ("lookup column") by pollutant
  - **INDIRECT** statement written to change the referenced external workbook and/or emission factor year as necessary
  - Variables (construction start year and truck speed) placed in external cell for flexibility

How can project-level analyses affect project development?

- Large commercial airport in California
  - Preferred alternative changed based on public comments
  - End result equals a hybrid of two alternatives analyzed in DEIR
- Projects located in ozone nonattainment regions
  - NOx emissions can be difficult to mitigate compared to PM
  - Incorporate emission control measures during project design and not as an afterthought with mitigation
  - General conformity requires mitigation to zero if de minimis thresholds exceeded

Possible tool and policy improvements

- Allow option to report emission factors in a variety of units (e.g., g/bhp-hr for OFFROAD)
- Combine all pollutants and fuel types into one consistent OFFROAD model
- Add methane (CH_4) and nitrous oxide (N_2O) to web-based EMFAC model
- Allow all pollutants to be reported by speed bin in EMFAC
- Add ability to select specific vehicle categories in EMFAC2011-PL
- Additional flexibility in EMFAC and OFFROAD for mitigation could improve analysis (e.g., emission tiers, model years, etc.)

Possible tool and policy improvements (continued)

- Add ability to select specific vehicle categories in EMFAC2011-PL
- Streamline the output reports for CalEEMod
- Expand land use options for CalEEMod
- Improve ability to analyze multiple phases in CalEEMod
- Include GSE and other industrial off-road equipment in CalEEMod for operations

Questions?

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