

EMFAC Modeling Change Technical Memo

SUBJECT: UPDATING VEHICLE MILES TRAVELED AND
SPEED DISTRIBUTIONS IN EMFAC WORKING DRAFT 2

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SUMMARY

A previous Technical Memo documented that all major urban areas in California submitted revised vehicle miles traveled (VMT) and speed distributions in 2005 to update the motor vehicle emissions model, EMFAC. The 2005 update to EMFAC is known as the Working Draft 1 (WD1). This current memo addresses a 2006 update that includes VMT revisions for three areas: the South Coast region, the Sacramento Nonattainment Area, and Santa Barbara County; and, speed distribution updates for the South Coast region only. The 2006 update to EMFAC is known as the Working Draft 2 (WD2). The WD2 reflects other technical revisions in addition to VMT and speeds that are discussed in technical memos available at <http://www.arb.ca.gov/msei/msei.htm>.

WD2 includes an update to vehicle populations. Because vehicle populations and mileage accrual are used in the VMT matching algorithm in EMFAC, VMT had to be re-matched. The net effect of the matching was that vehicle populations were updated while VMT remained the same in WD1 and WD2 for all areas of the state that provided data in 2005, with the exception that VMT was revised to reflect new data for the three areas mentioned above. Speed distributions and time period definitions in WD2 were carried forward from WD1 with the exception that speed distributions for the South Coast region were revised.

This memorandum provides details on the VMT and speed distribution data submitted in 2006, the issues raised during the quality assurance data review process, and the emission impacts from the updates.

Statewide, the VMT updates in the WD2 caused a decrease in emissions of less than 1% for ROG, roughly 2% for NO_x, and 4% for PM₁₀ in calendar year (CY) 2002. In the same year in the South Coast Air Basin the updated speed distributions in the WD2 caused an increase in emissions of roughly 2% for ROG, 3% for NO_x, and 6% for PM₁₀.

DATA UPDATED

The years of VMT data updated in the WD2 are summarized in Table 1. Calendar year 2040 was extrapolated.

Table 1: VMT Updated by Area

AGENCY	COUNTY	AIR BASIN	AREA	BASE YR	CALENDAR YEARS								NOTES
SACOG	EIDorado (MC)	Sacramento	9	2000	2006	2010	2015	2020	2025	2030	2035	2040	ARB matched to EMFAC 2002 Ver 2.2 (Apr03)
	Placer (SV)	Sacramento	30	2000	2006	2010	2015	2020	2025	2030	2035	2040	
	Placer (MC)	Sacramento	12	2000	2006	2010	2015	2020	2025	2030	2035	2040	
	Sacramento	Sacramento	31	2000	2006	2010	2015	2020	2025	2030	2035	2040	
	Sutter	Sacramento	34	2000	2006	2010	2015	2020	2025	2030	2035	2040	
	Yolo	Sacramento	36	2000	2006	2010	2015	2020	2025	2030	2035	2040	
	Yuba	Sacramento	37	2000	2006	2010	2015	2020	2025	2030	2035	2040	
SBCAG	Santa Barbara	South Central Coast	57	2005	2010	2015	2020	2030	2040				Feb 05 ARB rematched May 06
SCAG	Los Angeles	South Coast	59	2002	2007	2010	2013	2015	2020	2030	2035	2040	May 25, 2006
SCAG	Orange	South Coast	60	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	Riverside with Banning	South Coast	61	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	San Bernardino	South Coast	62	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	Los Angeles (Antelope Valley)	Mojave Desert	68	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	San Bernardino (VV + MV)	Mojave Desert	69	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	Riverside (Coachella Valley)	Salton Sea	64	2002	2007	2010	2013	2015	2020	2030	2035	2040	
SCAG	Ventura	South Central Coast	58	2002	2007	2010	2013	2015	2020	2030	2035	2040	

Speed data for the South Coast region only were updated in WD2. The years submitted are summarized in Table 2.

Table 2: Speed Distributions Updated

AGENCY	COUNTY	AIR BASIN	AREA	CALENDAR YEARS								NOTES	
SCAG	Los Angeles	South Coast	59	2002	2005	2007	2010	2013	2015	2020	2030	2035	May 25, 2006
SCAG	Orange	South Coast	60	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	Riverside with Banning	South Coast	61	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	San Bernardino	South Coast	62	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	Los Angeles (Antelope Valley)	Mojave Desert	68	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	San Bernardino (VV + MV)	Mojave Desert	69	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	Riverside (Coachella Valley)	Salton Sea	64	2002	2005	2007	2010	2013	2015	2020	2030	2035	
SCAG	Ventura	South Central Coast	58	2002	2005	2007	2010	2013	2015	2020	2030	2035	

SOUTH COAST

The Southern California Association of Governments (SCAG) submitted estimated VMT and speed distributions to ARB in April and May 2006. The data were generated from SCAG's travel demand model and also from SCAG's truck model. Table 3 summarizes the details of the submittal and how ARB processed the data.

Table 3: SCAG Submittals

Traffic Model Citation:	Draft 2007 AQMP Interim Model Runs (April and May 2006) SCAG developed an Interim Travel Demand Model for WD2 and the 2007 AQMP/SIP. The Interim Travel Demand Model is based on the current Regional Travel Demand Model with the following improvements: revised socio-economic data, new trip rates, new port trips, new Heavy Duty Truck External Model, and revised volume delay curves.
Submittal Dates and Data Years for VMT and Speeds:	April 6, 2006: CYs 1997, 2002, 2005, 2007, 2010, 2013, 2015, 2020, 2030, 2035 May 22, 2006 (Speeds not binned correctly): CYs 2002, 2005, 2007, 2010, 2013, 2015, 2020, 2030, 2035 May 25, 2006 CYs 2002, 2005, 2007, 2010, 2013, 2015, 2020, 2030, 2035

<p>VMT Vehicle Classes:</p>	<p>VMT totals for light- and medium-duty vehicles and motorcycles combined. VMT totals for heavy-duty trucks combined. (No data for buses or motor homes.)</p> <p>Light-duty: Using the May 25, 2006 data, ARB matched SCAG VMT totals for light- and medium-duty vehicles plus motorcycles by sub-area and distributed VMT by vehicle class based on updated DMV/BAR data. ARB added VMT for buses and motor homes using DMV/BAR data.</p> <p>Heavy-duty: Using SCAG's Truck Model data (May 25, 2006), ARB matched SCAG VMT totals for heavy-duty trucks and distributed VMT by vehicle class based on updated DMV data and ARB's heavy heavy-duty vehicle distribution developed in 2005.</p> <p>This process was repeated for all sub-areas except San Bernardino (SCAB), Ventura (SCCAB), Los Angeles (Antelope Valley MDAB), and Riverside (Coachella Valley SSAB). For these four sub-areas, ARB used heavy-duty vehicle VMT based on the DMV data in combination with ARB's heavy heavy-duty truck VMT redistribution of 2005. This was done because SCAG's interim truck model is still generating significantly lower VMT estimates in these areas than were agreed upon by SCAG, the air districts and ARB in 2005. (SCAG provided ARB with adjusted speed distributions to reflect the heavy-duty truck VMT adjustments.) Updated VMT estimates for heavy-duty trucks are anticipated again in the coming months following further updates to the truck model, whereupon the issue will be revisited.</p>
<p>Speed Vehicle Classes:</p>	<p>Speed distributions were provided for the combined light- and medium-duty fleet including motorcycles. Separate speed distributions were provided for heavy-duty trucks combined (LHDT1, LHDT2, MHDT, and HHDT) derived from SCAG's truck model. The May 25, 2006 speeds did reflect HDV VMT adjustments in the four areas mentioned above.</p>
<p>Speed Distributions By Periods:</p>	<p>Speed distributions were provided for AM Peak (hours 6-8), PM Peak (15-18), Midday (9-14), Night (0-5 and 19-23), and Daily.</p>
<p>Periods Definitions:</p>	<p>EMFAC time periods for the South Coast are unchanged from WD1. Period 1 (Hours 0-5), Period 2 (Hours 6-8), Period 3 (Hours 9-11), Period 4 (Hours 12-14), Period 5 (Hours 15-18), Period 6 (Hours 19-23).</p>

South Coast Activity Data Review and Issues

ARB staff reviewed the VMT and speeds data for anomalies, compared VMT trends to past submittals and other independent sources of data, and configured the data submitted into appropriate format for the EMFAC model. During the quality assurance (QA) process, ARB compared SCAG's VMT trends (Apr06) by county, CYs 2000 through 2030, in 5-year increments to several data sources:

South Coast State Implementation Plan (SIP) 2003
EMFAC 2002, Version 2.2 (Apr03)
EMFAC WD1 (SCAG 2005 Submittal and Heavy-Duty Truck VMT Agreement)
California Motor Vehicle Stock, Travel and Fuel Forecast, Dec 2005 (MVSTAFF Dec05)

VMT growth rates were also compared to human population growth rates from State of California, Department of Finance, Demographic Research Unit, "Population Projections by Race/Ethnicity for California and Its Counties 2000-2050, Sacramento, California, May 2004 (Human Pop May04). The results are shown in Chart 1. One important conclusion drawn from the chart is that the new data have slower VMT growth rates than was estimated for the 2003 SIP.

The speeds analysis included calculations of mean speeds by county, year, period, and vehicle classes. ARB reviewed mean speed trends over time and also examined VMT assignments to each of the 13 speed bins. Figures 1 through 8 show the graphs of weighted mean speed for the SCAG region based on the updates. The graphs show how the mean speed compares between calendar years within the same area, for different periods of the day, for light duty vehicles and heavy duty vehicles.

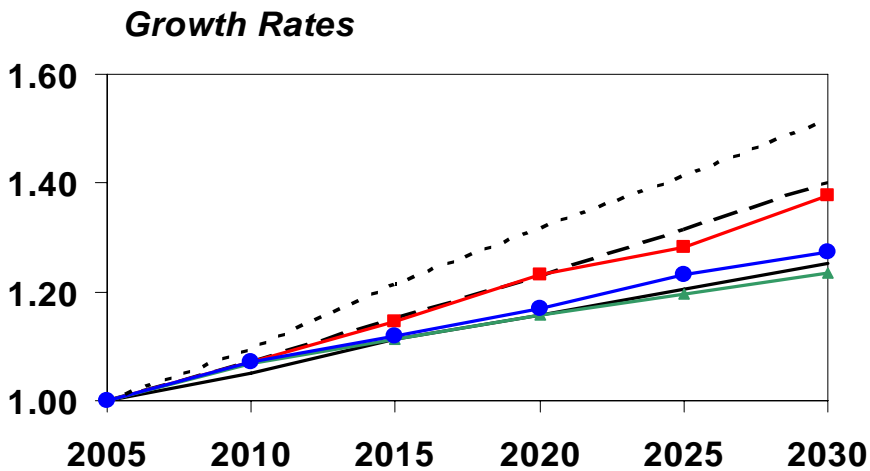
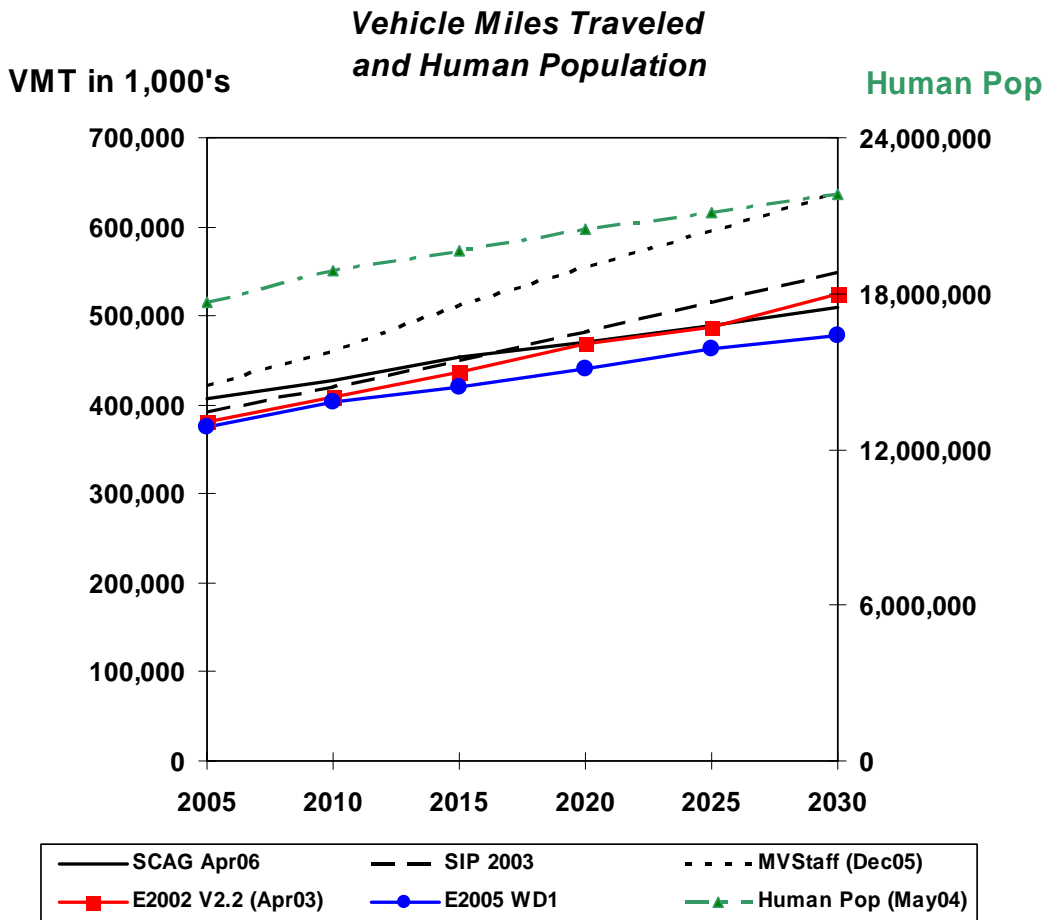
Light-duty vehicle mean speeds in urban areas show little change over time, while mean speeds for rural areas slow down, particularly in the Coachella Valley. For the heavy duty vehicles, the graphs show faster speeds than for light duty vehicles. The trend into the future also is faster unlike the light duty vehicles, especially for San Bernardino County and Victor Valley.

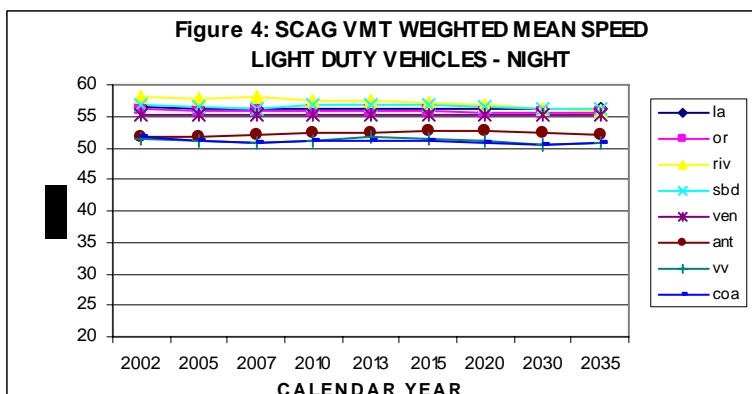
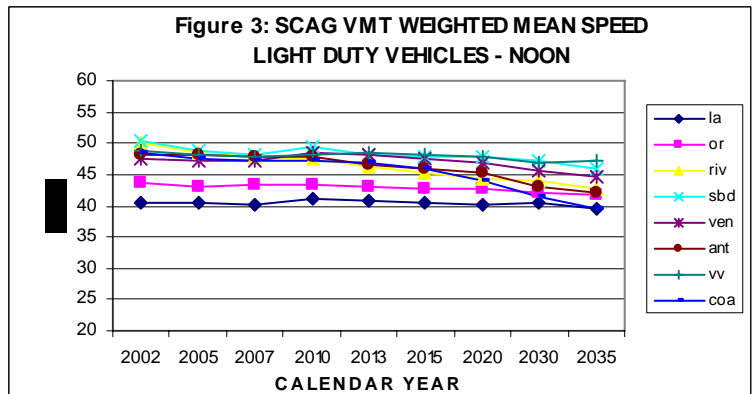
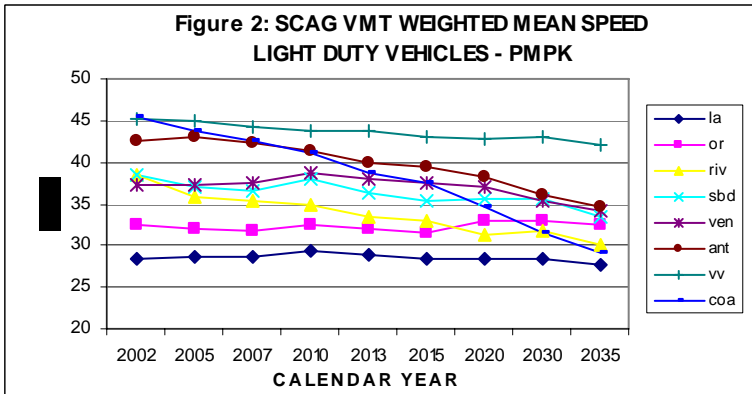
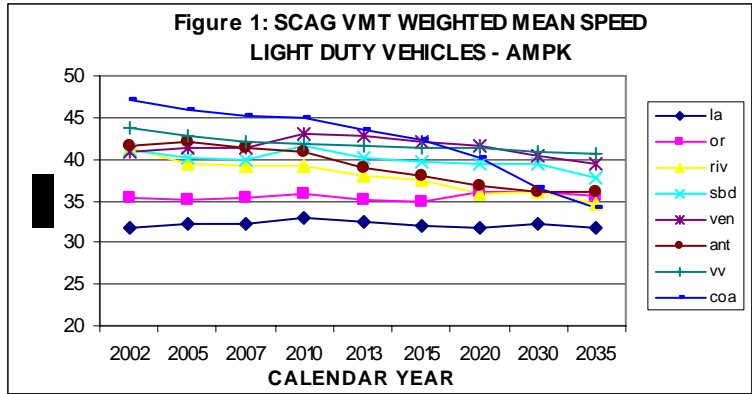
After reviewing SCAG's data, ARB's Motor Vehicle Assessments Section and Analysis Section developed questions that were later discussed with SCAG and shared with the South Coast Air Quality Management District (SCAQMD). The complete set of questions along with SCAG's written answers are attached to this technical memo as Appendix A.

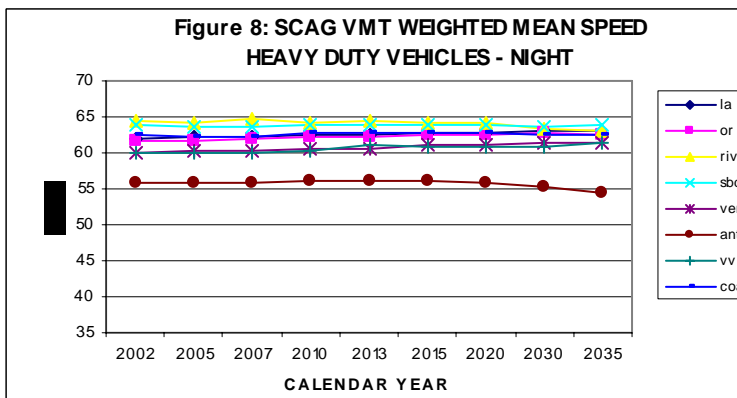
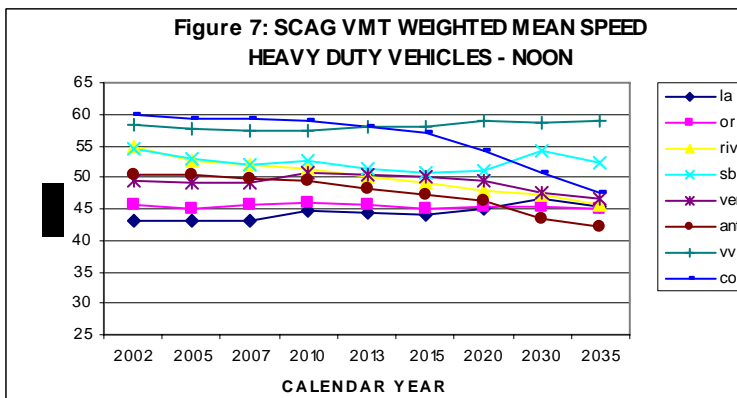
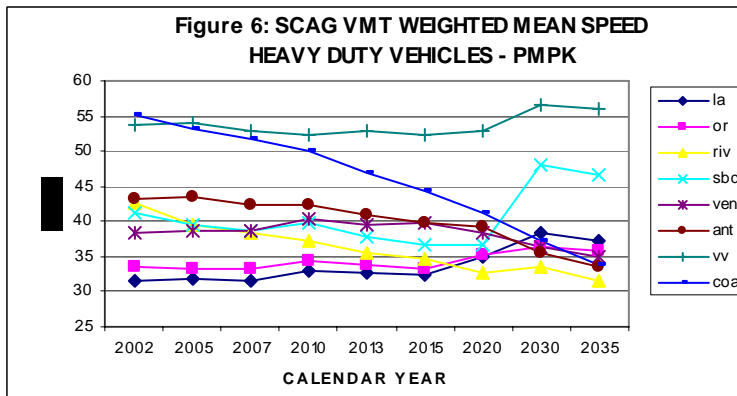
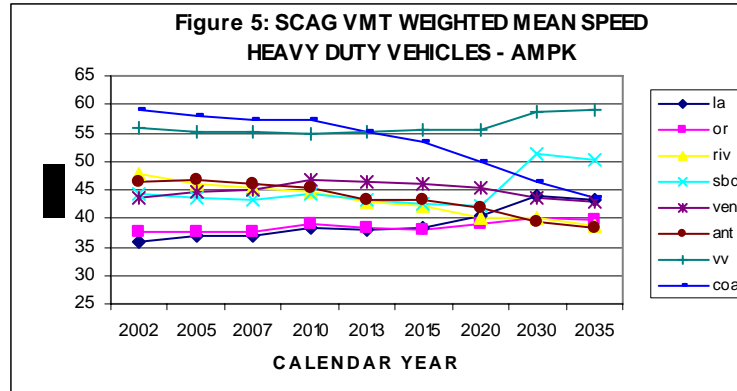
ARB's data review resulted in SCAG preparing additional model runs to smooth out VMT dips in early years and to insure that VMT was assigned to the correct speed bins. ARB asked questions pertaining to higher mean speeds for trucks than cars and increasing mean speeds over time. SCAG explained that trucks will have higher mean speeds than cars because they spend a bigger portion of their travel time on freeways than cars. Increasing mean speeds were attributed to anticipated new truck lanes. ARB staff has followed up with a request to compare cars and trucks on the same link at the same time, and SCAG is preparing this information.

SCAG and ARB agreed to use heavy-duty VMT based on the DMV data in combination with ARB's heavy-duty truck VMT redistribution for four areas: San Bernardino (SCAB), Ventura (SCCAB), Los Angeles (Antelope Valley MDAB), and Riverside (Coachella Valley SSAB). This was done because SCAG's truck model generated lower VMT estimates for these four areas than was agreed upon by both agencies in 2005. Updated VMT estimates for heavy-duty trucks are anticipated again when SCAG completes the update to its internal truck model. SCAG also provided ARB with adjusted speed distributions to reflect the heavy-duty truck VMT adjustments for the four areas.

Chart 1: South Coast Region







SACRAMENTO REGION

Working Draft 1:

ARB intended to update VMT for the Sacramento region in WD1. The Technical Memo on updating VMT and speeds in WD1 describes a VMT adjustment that used baseline VMT estimates taken from MVSTAFF in combination with VMT growth rates generated from the Sacramento Area Council of Governments (SACOG) travel demand model, SACMET. As it turns out, the VMT adjustment did not occur in WD1. Instead, WD1 reflects VMT estimates based on updated DMV/BAR information. However, updated speed distributions from the SACMET model are reflected in WD1.

Working Draft 2:

In May 2006, ARB, SACOG, the Sacramento Metropolitan Air Quality Management District (SMAQMD) consulted on what VMT estimates should be used in WD2. The three agencies agreed that because VMT estimates anticipated from SACOG in the fall of 2006 were thought to more closely match the VMT in EMFAC2002, Version 2.2 (Apr03) than the VMT adjustment originally planned for WD1, the best approach would be to rematch Sacramento regional VMT with the estimates in EMFAC 2002. Thus, the WD2 contains EMFAC2002 VMT estimates and SACMET speed distributions carried forward from WD1.

SANTA BARBARA

In WD1, Santa Barbara County Association of Governments (SBCAG) provided total VMT estimates for light-duty vehicles. The distribution by vehicle class and also heavy-duty vehicle VMT was based on ARB's methodology using DMV data. Because WD2 reflects an update to DMV data and resulting vehicle populations, it was necessary to recalculate and rematch VMT for Santa Barbara in WD2. The total VMT for light-duty vehicles remains unchanged from WD1. HD trucks VMT reflect ARB updates to WD2. Speed distributions in WD2 are carried forward from WD1.

EMISSIONS IMPACTS FROM UPDATED VMT (Version 2.236 COMPARED TO Version 2.235)

ARB estimates the impacts associated with a given change in the EMFAC model by making one type of change at a time and then comparing the difference in emissions. Version 2.235 of the WD2 model reflects revisions made up to the point of updating VMT. Version 2.236 includes VMT updates. Thus, the difference between 2.235 and 2.236 can be attributed to the difference in VMT methodologies.

One point of clarification is that Version 2.235 includes updated DMV/BAR data used to establish base year vehicle populations, accrual rates, and resulting VMT. Also, heavy heavy-duty diesel truck (HHDDT) growth rates were revised during ARB's 2005 redistribution of statewide HHDDT VMT and carried forward to WD2. Hence, the VMT assignments used as the base case in the following comparisons are different than those in EMFAC 2002, Version 2.2 which contains previous transportation planning agencies (TPAs) data and will be used in air quality plans and evaluations up to the release of the final EMFAC 2007.

To the extent that TPA VMT estimates were less than the VMT in EMFAC Version 2.235 calculated from DMV/BAR data, the emissions associated with the new VMT are also less.

Table 4 shows the statewide differences in emissions, vehicle population, and VMT between Version 2.235 and 2.236. In CY 2002 there was less than 1% fewer VMT and ROG, roughly 2% less NO_x, and 4% less PM₁₀ statewide. In CY 2020 there was roughly 2% fewer VMT and ROG, 5% less NO_x, and 3% less PM₁₀.

Table 5 shows that the South Coast Air Basin had 2% more VMT and 1% more ROG, 3% more NO_x, and 4% more PM₁₀ in CY 2002 when compared to EMFAC Version 2.235. In 2020, the South Coast had 5% less VMT and 7% less ROG, 4% less NO_x, and 4% less PM₁₀. The new South Coast VMT data reflect higher VMT in the base year and slower growth rates than in the comparison set of VMT data. For more detailed information, see Tables 4 through 9.

Table 4: Statewide New VMT and Emission Impacts

Statewide Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	14820281	445904860	3477.91	31139.08	2398.61	303335.50	69.77
1990	22523632	708771140	2516.88	24766.84	2621.27	445241.80	112.67
2000	26785744	811462660	1432.85	12916.52	2011.29	497285.80	78.78
2002	28178674	866352380	1183.00	10414.90	1845.70	529880.80	73.71
2005	30423048	938830850	1018.57	8344.63	1765.47	584678.90	76.54
2010	33306360	1009091500	762.18	5904.49	1356.74	626826.00	67.77
2015	35565900	1072027500	574.45	4074.44	941.19	672990.80	61.86
2020	37789764	1141573600	453.73	2917.12	673.27	724283.80	59.91
Statewide Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	14820281	446763070	3479.84	31176.98	2389.85	303160.40	67.55
1990	22523632	708317890	2511.55	24733.60	2592.32	443226.20	107.14
2000	26785744	809525950	1427.33	12866.84	1973.40	494218.60	75.23
2002	28178674	864034110	1176.91	10367.19	1804.53	526363.60	70.57
2005	30423048	935561280	1011.88	8296.41	1717.15	580156.30	73.39
2010	32329124	970317630	740.30	5734.98	1272.97	599294.40	63.46
2015	34878012	1046666300	561.81	3982.80	904.24	653235.40	59.57
2020	37058640	1113107600	445.05	2848.10	642.25	702379.20	57.83
Difference (Ver. 2.236 - Ver. 2.235) in Statewide Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	858210	1.93	37.90	-8.76	-175.10	-2.22
1990	0	-453250	-5.33	-33.24	-28.95	-2015.60	-5.53
2000	0	-1936710	-5.52	-49.68	-37.89	-3067.20	-3.55
2002	0	-2318270	-6.09	-47.71	-41.17	-3517.20	-3.14
2005	0	-3269570	-6.69	-48.22	-48.33	-4522.60	-3.15
2010	-977236	-38773870	-21.89	-169.51	-83.77	-27531.60	-4.31
2015	-687888	-25361200	-12.64	-91.64	-36.95	-19755.40	-2.29
2020	-731124	-28466000	-8.68	-69.02	-31.02	-21904.60	-2.09
Percentage Change in Statewide Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.19%	0.06%	0.12%	-0.37%	-0.06%	-3.18%
1990	0.00%	-0.06%	-0.21%	-0.13%	-1.10%	-0.45%	-4.90%
2000	0.00%	-0.24%	-0.39%	-0.38%	-1.88%	-0.62%	-4.51%
2002	0.00%	-0.27%	-0.51%	-0.46%	-2.23%	-0.66%	-4.27%
2005	0.00%	-0.35%	-0.66%	-0.58%	-2.74%	-0.77%	-4.12%
2010	-2.93%	-3.84%	-2.87%	-2.87%	-6.17%	-4.39%	-6.36%
2015	-1.93%	-2.37%	-2.20%	-2.25%	-3.93%	-2.94%	-3.70%
2020	-1.93%	-2.49%	-1.91%	-2.37%	-4.61%	-3.02%	-3.48%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type Using Populations							

Table 5: South Coast Air Basin New VMT and Emission Impacts

South Coast Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	6132014	180111760	1306.88	11201.81	860.79	120323.20	20.37
1990	9485569	284606850	984.46	9425.46	926.22	173276.30	30.63
2000	11074646	321914240	548.48	4868.92	662.39	189907.40	23.34
2002	11605898	343466460	443.51	3865.99	589.86	201366.70	22.30
2005	12664966	378435970	375.89	3088.44	544.03	224009.50	23.74
2010	13634670	402063740	268.70	2105.71	419.40	238673.70	22.89
2015	14284401	411990780	202.64	1454.59	293.56	247012.40	21.78
2020	14867839	426596480	161.14	1045.72	209.78	258148.80	21.44
South Coast Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	6132014	183651630	1323.80	11440.09	880.57	122893.30	21.48
1990	9485569	289884830	997.10	9617.42	949.64	176882.10	32.10
2000	11074646	327246430	552.77	4951.33	679.79	193280.70	24.28
2002	11605898	349016580	446.36	3931.28	605.68	204831.50	23.14
2005	12664966	384365980	378.00	3140.73	559.29	227772.40	24.59
2010	12632730	374008290	252.21	2000.96	394.85	221490.90	21.72
2015	13426979	393295620	190.57	1392.01	288.14	235310.80	21.25
2020	13980593	406764290	150.44	998.16	202.15	245671.30	20.68
Difference (Ver. 2.236 - Ver. 2.235) in South Coast Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	3539870	16.92	238.28	19.78	2570.10	1.11
1990	0	5277980	12.64	191.96	23.42	3605.80	1.47
2000	0	5332190	4.29	82.41	17.40	3373.30	0.93
2002	0	5550120	2.85	65.29	15.82	3464.80	0.84
2005	0	5930010	2.11	52.29	15.26	3762.90	0.85
2010	-1001940	-28055450	-16.50	-104.75	-24.55	-17182.80	-1.17
2015	-857422	-18695160	-12.07	-62.58	-5.42	-11701.60	-0.53
2020	-887246	-19832190	-10.70	-47.56	-7.63	-12477.50	-0.76
Percentage Change in South Coast Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	1.97%	1.29%	2.13%	2.30%	2.14%	5.47%
1990	0.00%	1.85%	1.28%	2.04%	2.53%	2.08%	4.80%
2000	0.00%	1.66%	0.78%	1.69%	2.63%	1.78%	4.00%
2002	0.00%	1.62%	0.64%	1.69%	2.68%	1.72%	3.75%
2005	0.00%	1.57%	0.56%	1.69%	2.80%	1.68%	3.58%
2010	-7.35%	-6.98%	-6.14%	-4.97%	-5.85%	-7.20%	-5.12%
2015	-6.00%	-4.54%	-5.96%	-4.30%	-1.85%	-4.74%	-2.42%
2020	-5.97%	-4.65%	-6.64%	-4.55%	-3.64%	-4.83%	-3.56%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type Using Populations							

Table 6: Sacramento Valley Air Basin New VMT and Emission Impacts

Sacramento Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1189825	32685956	286.92	2556.19	185.19	22220.85	5.58
1990	1761186	51388540	203.13	1940.07	203.69	32685.44	9.40
2000	2069101	56619080	119.81	1012.84	158.99	35440.91	6.05
2002	2254310	62627784	103.89	846.15	149.30	38869.75	5.65
2005	2458620	68451232	93.15	687.54	146.25	43510.75	5.87
2010	2784698	75470736	74.56	501.58	110.61	47292.41	5.03
2015	3013448	82945800	56.27	338.24	75.24	52072.18	4.55
2020	3278838	91666704	43.84	235.02	52.70	57809.38	4.43
Sacramento Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1189825	32719290	286.79	2550.36	184.40	22180.73	5.44
1990	1761186	51269384	202.59	1929.45	202.18	32536.57	9.21
2000	2069101	56313896	119.54	1007.34	157.36	35188.09	5.94
2002	2254310	62287916	103.68	841.41	147.72	38597.25	5.55
2005	2458620	68064928	92.94	683.18	144.55	43199.04	5.77
2010	2687600	72315480	72.21	481.85	106.39	45328.09	4.81
2015	2937262	80229872	55.04	327.41	72.73	50407.80	4.38
2020	3183412	87974056	43.00	227.67	51.01	55577.20	4.25
Difference (Ver. 2.236 - Ver. 2.235) in Sacramento Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	33334	-0.13	-5.83	-0.79	-40.12	-0.14
1990	0	-119156	-0.54	-10.62	-1.50	-148.87	-0.19
2000	0	-305184	-0.26	-5.50	-1.62	-252.82	-0.12
2002	0	-339868	-0.22	-4.74	-1.58	-272.50	-0.10
2005	0	-386304	-0.21	-4.37	-1.70	-311.71	-0.10
2010	-97098	-3155256	-2.34	-19.73	-4.22	-1964.32	-0.22
2015	-76186	-2715928	-1.23	-10.83	-2.51	-1664.38	-0.17
2020	-95426	-3692648	-0.84	-7.35	-1.69	-2232.18	-0.18
Percentage Change in Sacramento Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.10%	-0.05%	-0.23%	-0.43%	-0.18%	-2.44%
1990	0.00%	-0.23%	-0.27%	-0.55%	-0.74%	-0.46%	-2.06%
2000	0.00%	-0.54%	-0.22%	-0.54%	-1.02%	-0.71%	-1.95%
2002	0.00%	-0.54%	-0.21%	-0.56%	-1.06%	-0.70%	-1.78%
2005	0.00%	-0.56%	-0.22%	-0.64%	-1.17%	-0.72%	-1.71%
2010	-3.49%	-4.18%	-3.14%	-3.93%	-3.81%	-4.15%	-4.40%
2015	-2.53%	-3.27%	-2.19%	-3.20%	-3.34%	-3.20%	-3.80%
2020	-2.91%	-4.03%	-1.92%	-3.13%	-3.20%	-3.86%	-4.10%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type							

Table 7: San Francisco Air Basin New VMT and Emission Impacts

San Francisco Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	3577716	104617360	854.86	7804.18	552.09	66204.55	9.83
1990	4628040	140955040	489.51	4909.01	468.43	81403.26	13.35
2000	5519135	164048450	276.08	2527.35	320.97	97106.85	10.25
2002	5644102	169326690	233.02	2132.75	295.68	100972.50	9.93
2005	5761704	171424320	186.42	1566.21	247.97	104037.40	10.14
2010	6177318	180286540	135.26	1073.11	180.73	109640.30	9.80
2015	6599949	192617780	99.46	726.17	124.05	117288.30	9.69
2020	6945798	202467020	76.24	505.61	87.92	125207.40	9.88
San Francisco Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	3577716	104632620	854.94	7805.35	552.17	66213.66	9.83
1990	4628040	140976000	489.55	4909.77	468.50	81414.85	13.36
2000	5519135	164072610	276.10	2527.72	321.02	97120.80	10.25
2002	5644102	169352020	233.04	2133.07	295.74	100987.20	9.93
2005	5761704	171450350	186.43	1566.45	248.01	104052.90	10.14
2010	6354504	185684960	138.70	1101.29	184.70	112854.10	10.07
2015	6831801	199520180	102.80	750.83	127.06	121385.40	10.01
2020	7185647	209588190	78.87	523.29	89.75	129496.40	10.21
Difference (Ver. 2.236 - Ver. 2.235) in San Francisco Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	15260	0.08	1.17	0.08	9.11	0.00
1990	0	20960	0.04	0.75	0.07	11.59	0.00
2000	0	24160	0.02	0.38	0.06	13.95	0.00
2002	0	25330	0.01	0.32	0.05	14.70	0.00
2005	0	26030	0.01	0.25	0.04	15.50	0.00
2010	177186	5398420	3.44	28.18	3.96	3213.80	0.27
2015	231852	6902400	3.34	24.66	3.01	4097.10	0.32
2020	239849	7121170	2.63	17.68	1.83	4289.00	0.33
Percentage Change in San Francisco Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.01%	0.01%	0.02%	0.01%	0.01%	0.02%
1990	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%	0.02%
2000	0.00%	0.01%	0.01%	0.01%	0.02%	0.01%	0.02%
2002	0.00%	0.01%	0.01%	0.01%	0.02%	0.01%	0.02%
2005	0.00%	0.02%	0.01%	0.02%	0.02%	0.01%	0.02%
2010	2.87%	2.99%	2.54%	2.63%	2.19%	2.93%	2.76%
2015	3.51%	3.58%	3.35%	3.40%	2.43%	3.49%	3.33%
2020	3.45%	3.52%	3.45%	3.50%	2.08%	3.43%	3.35%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type							

Table 8: San Diego Air Basin New VMT and Emission Impacts

San Diego Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1097540	33491842	299.20	2707.25	176.70	23588.02	3.53
1990	1874233	64677812	204.76	2145.56	202.96	40794.89	6.19
2000	2227704	73160768	105.02	1022.82	143.38	41830.07	4.90
2002	2373876	79039952	87.64	845.79	128.57	45698.93	4.92
2005	2517309	83745456	72.23	666.70	113.13	49167.24	5.12
2010	2690155	86390224	53.18	466.55	85.66	50353.68	4.86
2015	2903248	92345936	41.48	331.60	63.17	54566.66	4.90
2020	3110795	98468600	34.64	249.31	49.05	58408.88	5.05
San Diego Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1097540	33494036	299.22	2707.44	176.71	23589.49	3.53
1990	1874233	64682144	204.77	2145.71	202.98	40797.50	6.19
2000	2227704	73165952	105.03	1022.88	143.39	41832.86	4.90
2002	2373876	79045424	87.64	845.85	128.57	45701.95	4.92
2005	2517309	83751264	72.23	666.73	113.15	49170.48	5.12
2010	2717240	87449160	53.51	469.72	86.51	50967.56	4.91
2015	2948011	93969632	41.85	334.80	64.04	55537.42	4.98
2020	3165209	100312400	35.01	252.36	49.84	59526.68	5.14
Difference (Ver. 2.236 - Ver. 2.235) in San Diego Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	2194	0.01	0.19	0.01	1.47	0.00
1990	0	4332	0.01	0.16	0.01	2.61	0.00
2000	0	5184	0.00	0.06	0.01	2.79	0.00
2002	0	5472	0.00	0.05	0.01	3.02	0.00
2005	0	5808	0.00	0.03	0.02	3.24	0.00
2010	27085	1058936	0.33	3.17	0.85	613.88	0.05
2015	44763	1623696	0.36	3.20	0.87	970.76	0.08
2020	54414	1843800	0.38	3.05	0.79	1117.80	0.09
Percentage Change in San Diego Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%
1990	0.00%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%
2000	0.00%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%
2002	0.00%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%
2005	0.00%	0.01%	0.00%	0.00%	0.02%	0.01%	0.01%
2010	1.01%	1.23%	0.61%	0.68%	0.99%	1.22%	1.12%
2015	1.54%	1.76%	0.88%	0.97%	1.38%	1.78%	1.60%
2020	1.75%	1.87%	1.09%	1.22%	1.61%	1.91%	1.81%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type							

Table 9: San Joaquin Valley Air Basin New VMT and Emission Impacts

San Joaquin Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.235)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1024248	35779680	276.31	2742.83	257.11	28316.75	14.12
1990	1680357	59288024	238.92	2407.89	336.38	44616.04	23.66
2000	2331738	77278016	161.44	1464.28	328.93	55854.04	15.24
2002	2488685	83768144	134.75	1185.08	315.93	59666.07	13.50
2005	2817390	94987664	123.96	986.33	328.85	69104.37	13.81
2010	3258037	107862560	97.68	726.41	251.36	76725.15	10.63
2015	3576016	120776700	72.88	495.60	171.61	87202.66	8.82
2020	3930086	134320190	57.02	352.37	122.30	97806.84	8.08
San Joaquin Summer Episodic On-Road Motor Vehicle Inventories With VMT3 Updates (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	1024248	33835264	266.73	2585.39	242.66	26827.77	13.04
1990	1680357	55922216	230.65	2267.18	316.26	42138.86	21.72
2000	2331738	72940840	157.32	1382.03	308.46	52774.10	13.95
2002	2488685	79023384	132.02	1118.12	296.37	56348.71	12.37
2005	2817390	89610120	121.87	929.28	308.38	65258.95	12.66
2010	3298758	103020200	97.81	691.22	238.06	73344.68	9.85
2015	3633203	115810910	73.57	472.63	162.93	83721.09	8.22
2020	4008386	129425270	57.85	336.45	116.67	94348.48	7.58
Difference (Ver. 2.236 - Ver. 2.235) in San Joaquin Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	-1944416	-9.59	-157.45	-14.46	-1488.98	-1.08
1990	0	-3365808	-8.27	-140.71	-20.12	-2477.18	-1.94
2000	0	-4337176	-4.12	-82.25	-20.47	-3079.94	-1.29
2002	0	-4744760	-2.72	-66.96	-19.56	-3317.36	-1.14
2005	0	-5377544	-2.10	-57.05	-20.47	-3845.42	-1.16
2010	40721	-4842360	0.13	-35.20	-13.31	-3380.47	-0.77
2015	57187	-4965790	0.70	-22.97	-8.67	-3481.57	-0.60
2020	78300	-4894920	0.83	-15.92	-5.63	-3458.36	-0.50
Percentage Change in San Joaquin Emission Inventories (relative to Ver. 2.235)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	-5.43%	-3.47%	-5.74%	-5.62%	-5.26%	-7.65%
1990	0.00%	-5.68%	-3.46%	-5.84%	-5.98%	-5.55%	-8.19%
2000	0.00%	-5.61%	-2.55%	-5.62%	-6.22%	-5.51%	-8.47%
2002	0.00%	-5.66%	-2.02%	-5.65%	-6.19%	-5.56%	-8.41%
2005	0.00%	-5.66%	-1.69%	-5.78%	-6.23%	-5.56%	-8.39%
2010	1.25%	-4.49%	0.13%	-4.85%	-5.29%	-4.41%	-7.28%
2015	1.60%	-4.11%	0.96%	-4.64%	-5.05%	-3.99%	-6.80%
2020	1.99%	-3.64%	1.46%	-4.52%	-4.60%	-3.54%	-6.15%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type							

EMISSIONS IMPACTS FROM UPDATED SPEED DISTRIBUTIONS **(Version 2.237 COMPARED TO Version 2.236)**

Data received as VMT by speed bin are converted into percent distributions. The speed distributions are put into the SPDASSIGN files for each area being updated according to calendar years and periods submitted. In order to determine the emissions impacts from speed distribution updates we compare EMFAC version 2.236 to 2.237. As noted earlier in this document, version 2.236 includes VMT updates but not speed revisions. Version 2.237 includes speed revisions as well. Thus, the difference in model run between the two version can be attributed to the effects of the updated speed distributions.

Table 10 shows that in CY 2002 the WD2 updates to speed distributions caused a statewide increase of less than 1% ROG, roughly 1% NO_x, and 2% PM₁₀. In CY 2020 there was a statewide increase of less than 1% in ROG , NO_x, and PM₁₀.

Table 11 shows the effects of updated speeds in the South Coast Air Basin. In CY 2002 there was an increase of roughly 2% in ROG, 3% in NO_x, and 6% in PM₁₀. In CY 2020 there was an increase of roughly 1% ROG, 3% NO_x, and 2% PM₁₀.

Table 10: Statewide Emission Impacts from New Speed Distributions

Statewide Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	14820281	446763070	3479.84	31176.98	2389.85	303160.40	67.55
1990	22523632	708317890	2511.55	24733.60	2592.32	443226.20	107.14
2000	26785744	809525950	1427.33	12866.84	1973.40	494218.60	75.23
2002	28178674	864034110	1176.91	10367.19	1804.53	526363.60	70.57
2005	30423048	935561280	1011.88	8296.41	1717.15	580156.30	73.39
2010	32329124	970317630	740.30	5734.98	1272.97	599294.40	63.46
2015	34878012	1046666300	561.81	3982.80	904.24	653235.40	59.57
2020	37058640	1113107600	445.05	2848.10	642.25	702379.20	57.83
Statewide Summer Episodic On-Road Motor Vehicle Inventories With Speed3 Updates (Calculated Using EMFAC2007 draft ver 2.237)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	14820281	446763070	3479.84	31176.98	2389.85	303160.40	67.55
1990	22523632	708317890	2511.55	24733.60	2592.32	443226.20	107.14
2000	26785744	809525950	1427.33	12866.84	1973.40	494218.60	75.23
2002	28178674	864034110	1183.47	10506.13	1821.02	532159.10	72.11
2005	30423048	935561280	1018.42	8418.17	1732.99	586735.90	74.93
2010	32329124	970317630	742.90	5788.77	1283.88	602671.60	64.20
2015	34878012	1046666300	564.22	4020.69	911.39	658138.80	60.10
2020	37058640	1113107600	446.69	2871.21	647.78	707186.20	58.10
Difference (Ver. 2.237 - Ver. 2.236) in Statewide Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	0	0.00	0.00	0.00	0.00	0.00
1990	0	0	0.00	0.00	0.00	0.00	0.00
2000	0	0	0.00	0.00	0.00	0.00	0.00
2002	0	0	6.56	138.94	16.49	5795.50	1.55
2005	0	0	6.54	121.76	15.84	6579.60	1.54
2010	0	0	2.60	53.79	10.91	3377.20	0.75
2015	0	0	2.41	37.89	7.15	4903.40	0.53
2020	0	0	1.64	23.11	5.53	4807.00	0.27
Percentage Change in Statewide Emission Inventories (relative to Ver. 2.236)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1990	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2002	0.00%	0.00%	0.56%	1.34%	0.91%	1.10%	2.19%
2005	0.00%	0.00%	0.65%	1.47%	0.92%	1.13%	2.10%
2010	0.00%	0.00%	0.35%	0.94%	0.86%	0.56%	1.18%
2015	0.00%	0.00%	0.43%	0.95%	0.79%	0.75%	0.88%
2020	0.00%	0.00%	0.37%	0.81%	0.86%	0.68%	0.47%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type Using Populations							

Table 11: South Coast Air Basin Emission Impacts from New Speed Distributions

South Coast Summer Episodic On-Road Motor Vehicle Inventories (Calculated Using EMFAC2007 draft ver 2.236)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	6132014	183651630	1323.80	11440.09	880.57	122893.30	21.48
1990	9485569	289884830	997.10	9617.42	949.64	176882.10	32.10
2000	11074646	327246430	552.77	4951.33	679.79	193280.70	24.28
2002	11605898	349016580	446.36	3931.28	605.68	204831.50	23.14
2005	12664966	384365980	378.00	3140.73	559.29	227772.40	24.59
2010	12632730	374008290	252.21	2000.96	394.85	221490.90	21.72
2015	13426979	393295620	190.57	1392.01	288.14	235310.80	21.25
2020	13980593	406764290	150.44	998.16	202.15	245671.30	20.68
South Coast Summer Episodic On-Road Motor Vehicle Inventories With Speed3 Updates (Calculated Using EMFAC2007 draft ver 2.237)							
Cal. Year	Population	VMT*(1000)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	6132014	183651630	1323.80	11440.09	880.57	122893.30	21.48
1990	9485569	289884830	997.10	9617.42	949.64	176882.10	32.10
2000	11074646	327246430	552.77	4951.33	679.79	193280.70	24.28
2002	11605898	349016580	453.85	4058.11	621.05	210944.40	24.52
2005	12664966	384365980	385.35	3250.91	573.62	234773.10	25.99
2010	12632730	374008290	255.62	2050.08	404.82	225471.30	22.51
2015	13426979	393295620	193.50	1426.59	294.89	240786.00	21.86
2020	13980593	406764290	152.34	1019.02	207.37	251059.00	21.02
Difference (Ver. 2.237 - Ver. 2.236) in South Coast Emission Inventories (tons per day)							
Cal. Year	Population	VMT(miles)	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0	0	0.00	0.00	0.00	0.00	0.00
1990	0	0	0.00	0.00	0.00	0.00	0.00
2000	0	0	0.00	0.00	0.00	0.00	0.00
2002	0	0	7.49	126.83	15.37	6112.90	1.38
2005	0	0	7.35	110.18	14.34	7000.70	1.41
2010	0	0	3.42	49.11	9.97	3980.40	0.79
2015	0	0	2.93	34.59	6.75	5475.20	0.60
2020	0	0	1.90	20.86	5.22	5387.70	0.34
Percentage Change in South Coast Emission Inventories (relative to Ver. 2.236)							
Cal. Year	Population	VMT	ROG_Tot ¹	CO_Tot	NOx_Tot	CO2_Tot	PM10_Tot ²
1980	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1990	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2002	0.00%	0.00%	1.68%	3.23%	2.54%	2.98%	5.95%
2005	0.00%	0.00%	1.95%	3.51%	2.56%	3.07%	5.72%
2010	0.00%	0.00%	1.35%	2.45%	2.53%	1.80%	3.62%
2015	0.00%	0.00%	1.54%	2.48%	2.34%	2.33%	2.82%
2020	0.00%	0.00%	1.26%	2.09%	2.58%	2.19%	1.63%
ROG_Tot ¹ - This includes running, starting, idle exhaust emissions and emissions from all evaporative processes.							
PM10_Tot ² - Total emissions from running, starting, idle processes, and from tire wear and brake wear.							
Fuel ³ - VMT Matching by Fuel Type Using Populations							

APPENDIX A
Southern California VMT and Speeds
for EMFAC WD2 and the 2007 AQMP/SIP
Data Review Questions for SCAG

Travel Model Citation

1. Please provide a citation that will uniquely identify the travel demand model runs that generated the vehicle activity for EMFAC2007 and the 2007 AQMP/SIP.

SCAG: Draft 2007 AQMP Interim Model Runs - SCAG developed an Interim Travel Demand Model for the draft EMFAC2007 and 2007 AQMP/SIP. The Interim Travel Demand Model is based on the current Regional Travel Demand Model with the following improvements: revised socio-economic data, new trip rates, new Port Trips, new Heavy Duty Truck External Model, and with revised volume delay curves.

Average Speeds

2. Los Angeles and Orange County heavy-duty truck mean speeds increase significantly between 2002 and 2035, particularly for the peak periods. This occurs despite steady increases in truck VMT. How can this best be explained?

SCAG: It appears data listed for 2030 am peak period in "hd chart" sheet are the same as that of 2020's.

The speed increase is attributed to the new truck lane facilities introduced in 04RTP (2030 Plan includes truck lanes from ports to Barstow along I-710, SR-60, and I-15).

One of SCAG's concerns is the use of VMT by 5 mile speed range. For example, the average 2030 am peak period heavy-duty truck speed in Orange County is 31.4 mph as estimated by the model. When estimated from VMT by 5 miles range, that speed becomes 35.1 mph.

3. Can you help us explain some other trends for HDTs?
 - Decreasing speeds in South Coast Riverside and Coachella, Antelope
 - Sharp increase in South Coast San Bernardino 2020-2030 (PM peak and mid-day)

SCAG: The addition of truck lane facilities will also increase average truck speeds in San Bernardino as well as having other distributional effects.

4. Heavy-duty truck mean speeds remain greater than light-duty mean speeds in the same period for all periods. Can you provide speed distributions by time period facility type, to help us understand the basis for this? How would we explain faster HDT speeds for the same periods on the same facilities?

SCAG: Yes, SCAG will provide the data.

5. To help us better understand the speed trends and differences in speeds by county, can SCAG provide average speeds by facility type and also per-lane capacity assumptions by facility type in terms of vehicles per hour per lane (vphpl) and total lane miles by facility type?

SCAG: Yes, SCAG will provide the data.

VMT

6. We note that VMT estimates are generally higher than those provided in 2005, and that growth rates are faster for HDTs. Is this consistent with SCAG's expectations given latest socioeconomic data and travel model improvements?

SCAG: Yes, the interim model was validated to 2003 HPMS.

7. For the areas of San Bernardino and Riverside Counties outside the current SCAG modeling domain, can ARB continue to use our own estimates? We would revisit these estimates when the SCAG domain is extended.

SCAG: Yes.

8. We are concerned about possible underestimation of HDT VMT in some areas. Compared to the estimates ARB, SCAG and SCAQMD agreed upon last summer, the April 2006 SCAG estimates are 60-80 percent lower in Coachella Valley, Antelope Valley, South Coast San Bernardino and Ventura County. To avoid undercounting emissions, would it be prudent to continue to use the 2005 ARB numbers--in some or all of those areas--and grow them with the new SCAG growth rates?

SCAG: Please use the 2005 ARB numbers. SCAG is reviewing external truck model and outputs prepared by Cambridge Systematics, Inc.

9. Can you tell us if the dip in heavy-duty VMT between 2005 and 2007, in South Coast San Bernardino, Antelope Valley, and Victor Valley, is correct? We note that all other counties show almost flat VMT growth for the same period; is that right? Finally, we see a dip in light and medium-duty VMT between 2007 and 2010 in South Coast Los Angeles and Banning; is this also correct?

SCAG: SCAG will check the model inputs SEDS.