Louisville Metro APCD data and associated analysis for ICG discussion for setting MVEB's for PM2.5 redesignation request SIP. Orange tab sheet contains primary data under consideration currently. That and other sheets listed below. - 3/22/11 CB

IN2004fleet	Primary data under consideration - calculated using 2004 Indiana fleet data
IN2009fleet	Emission totals calculated using 2009 Indiana fleet data; for future MVEB update when QA'd
compare	Comparison of emission totals (IN2004fleet & IN2009fleet)
2040	Analysis of a projected 2040 data set
AllData	Consolidation of all data in this workbook
Charts	Charts graphing data to analyze trends for setting MVEB margins, etc.
VMTtrends	Area VMT trends - VMT input used for calculations
MOB6vsMOVES	Approximate comparison of MOBILE6 vs. MOVES with the same input set
MOBILE6	Data: same year KIPDA plan inputs run with MOBIL6 - used to compare on sheet above

LOUISVILLE AQ NON-ATTAINMENT/MAINTENANCE AREA ANNUAL ONROAD MOBILE EMISSION TOTALS: TONS per YEAR

KIPDA VMT inputs: 10PlanA (July, 2010); APCD Mobile Suite g6a (MOVES); **2004 Indiana fleet data**

APCD 2/22/11 cb

	2005			2008			2015			2025		
	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2
Clark, IN	4,106.81	263.47	20.72	3,444.07	225.95	22.22	1,843.80	112.38	22.83	975.12	58.79	21.70
Floyd, IN	2,922.90	193.61	14.03	2,397.70	159.34	14.58	1,306.71	80.50	15.38	726.78	45.02	15.30
Bullitt, KY	2,952.07	165.41	12.11	2,820.80	167.76	13.28	1,782.71	107.96	15.01	948.69	54.78	16.33
Jefferson, KY	22,241.72	1,408.81	95.26	19,094.05	1,218.29	101.00	10,259.60	639.95	102.55	5,336.69	333.04	101.81
Madison Township, Jefferson Co., IN	521.05	15.11	2.10	403.83	11.23	2.09	199.31	4.88	1.97	109.90	2.65	2.01
Total:	**32,744.56**	**2,046.41**	**144.23**	**28,160.45**	**1,782.56**	**153.18**	**15,392.13**	**945.67**	**157.75**	**8,097.18**	**494.28**	**157.15**

data supplied by:

APCD
INDOT

LOUISVILLE AQ NON-ATTAINMENT/MAINTENANCE AREA ANNUAL ONROAD MOBILE EMISSION TOTALS: TONS per YEAR

KIPDA VMT inputs: 10PlanA (July, 2010); APCD Mobile Suite v1a (MOVES); **2009 Indiana fleet data**

APCD 2/22/11 cb

	2005			2008			2015			2025		
	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2
Clark, IN	4,223.29	256.03	20.03	3,677.03	211.06	20.83	2,104.93	119.11	21.77	1,030.55	65.40	20.61
Floyd, IN	3,011.87	189.28	13.58	2,575.65	150.67	13.68	1,504.35	85.56	14.61	804.38	52.62	15.23
Bullitt, KY	2,952.07	165.41	12.11	2,820.80	167.76	13.28	1,782.71	107.96	15.01	948.69	54.78	16.33
Jefferson, KY	22,241.72	1,408.81	95.26	19,094.05	1,218.29	101.00	10,259.60	639.95	102.55	5,336.69	333.04	101.81
Madison Township, Jefferson Co., IN	510.11	14.95	2.11	413.76	11.43	2.07	240.94	5.57	2.01	120.38	2.94	2.04
Total:	**32,939.07**	**2,034.47**	**143.10**	**28,581.28**	**1,759.20**	**150.87**	**15,892.52**	**958.16**	**155.95**	**8,240.69**	**508.78**	**156.02**

data supplied by:

APCD
INDOT

LOUISVILLE AQ NON-ATTAINMENT/MAINTENANCE AREA ANNUAL ONROAD MOBILE EMISSION TOTALS: TONS per YEAR

DATA SET COMPARISON

KIPDA VMT inputs: 10PlanA (July, 2010); Calculated with MOVES 2010a

APCD Mobile Suite: **G6a;** with **2004 Indiana fleet data vs. V1a**; with **2009 Indiana fleet data**

(V1a-G6a)/G6a 2004 data --> 2009 data

APCD 3/15/11 cb

	2005			2008			2015			2025		
	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2
Clark, IN	2.84%	-2.83%	-3.35%	6.76%	-6.59%	-6.26%	14.16%	5.99%	-4.67%	5.68%	11.25%	-5.01%
Floyd, IN	3.04%	-2.24%	-3.21%	7.42%	-5.44%	-6.17%	15.12%	6.30%	-5.01%	10.68%	16.88%	-0.48%
Bullitt, KY	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Jefferson, KY	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Madison Township, Jefferson Co., IN	-2.10%	-1.04%	0.49%	2.46%	1.78%	-0.91%	20.89%	14.09%	1.83%	9.53%	10.91%	1.55%
Total:	**0.59%**	**-0.58%**	**-0.79%**	**1.49%**	**-1.31%**	**-1.51%**	**3.25%**	**1.32%**	**-1.14%**	**1.77%**	**2.93%**	**-0.72%**

data supplied by:

APCD
INDOT

PM/Annual Tons/Year
using draft/unofficial KIPDA VMT
2004 Indiana Fleet Data (APCD Mobile Suite G6)

	2040		
	NOx	**PM2.5**	**SO2**
Clark	618.83	38.65	15.88
Floyd	693.06	44.93	17.34
Bullitt	771.30	45.85	17.77
Jefferson	4797.67	300.55	107.99

PM/Annual Tons/Year
using draft/unofficial KIPDA VMT
2009 Indiana Fleet Data (APCD Mobile Suite v1)

	2040		
	NOx	**PM2.5**	**SO2**
Clark	874.09	60.96	21.56
Floyd	648.02	48.32	15.23
Bullitt	771.30	45.85	17.77
Jefferson	4797.67	300.55	107.99

Differences 2004 --> 2009 (v1-g6/g6)

	2040		
	NOx	**PM2.5**	**SO2**
Clark	41.25%	57.73%	35.79%
Floyd	-6.50%	7.55%	-12.12%
Bullitt	0.00%	0.00%	0.00%
Jefferson	0.00%	0.00%	0.00%

MOBILE EMISSIONS TOTALS: LOUISVILLE PM2.5 NONATTAINMENT AREA (MOVES model)

2004 INDIANA FLEET DATA

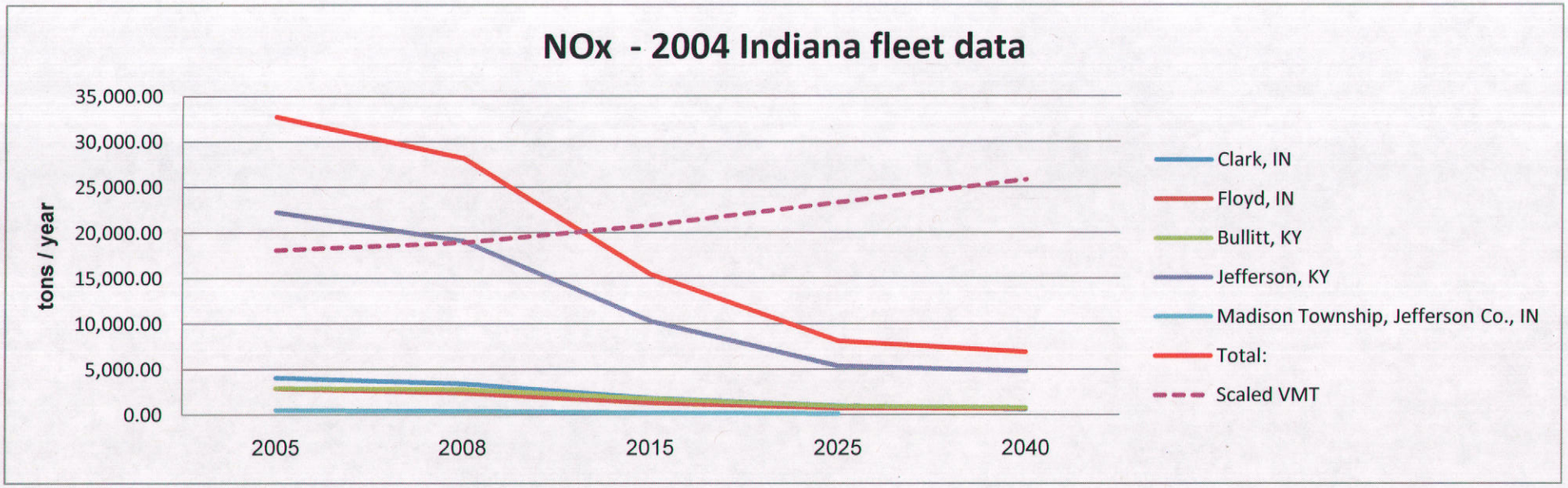
	2005	2008	2015	2025	2040
NOx					
Clark, IN	4,106.81	3,444.07	1,843.80	975.12	618.83
Floyd, IN	2,922.90	2,397.70	1,306.71	726.78	693.06
Bullitt, KY	2,952.07	2,820.80	1,782.71	948.69	771.30
Jefferson, KY	22,241.72	19,094.05	10,259.60	5,336.69	4797.67
Madison Township, Jefferson Co., IN	521.05	403.83	199.31	109.90	
Total:	32,744.56	28,160.45	15,392.13	8,097.18	6880.87
PM2.5					
Clark, IN	263.47	225.95	112.38	58.79	38.65
Floyd, IN	193.61	159.34	80.50	45.02	44.93
Bullitt, KY	165.41	167.76	107.96	54.78	45.85
Jefferson, KY	1,408.81	1,218.29	639.95	333.04	300.55
Madison Township, Jefferson Co., IN	15.11	11.23	4.88	2.65	
Total:	2,046.41	1,782.56	945.67	494.28	429.98
SO2					
Clark, IN	20.72	22.22	22.83	21.70	15.88
Floyd, IN	14.03	14.58	15.38	15.30	17.34
Bullitt, KY	12.11	13.28	15.01	16.33	17.77
Jefferson, KY	95.26	101.00	102.55	101.81	107.99
Madison Township, Jefferson Co., IN	2.10	2.09	1.97	2.01	
Total:	144.23	153.18	157.75	157.15	158.97
All Pollutants:	34,935.20	30,096.19	16,495.55	8,748.61	7,469.82

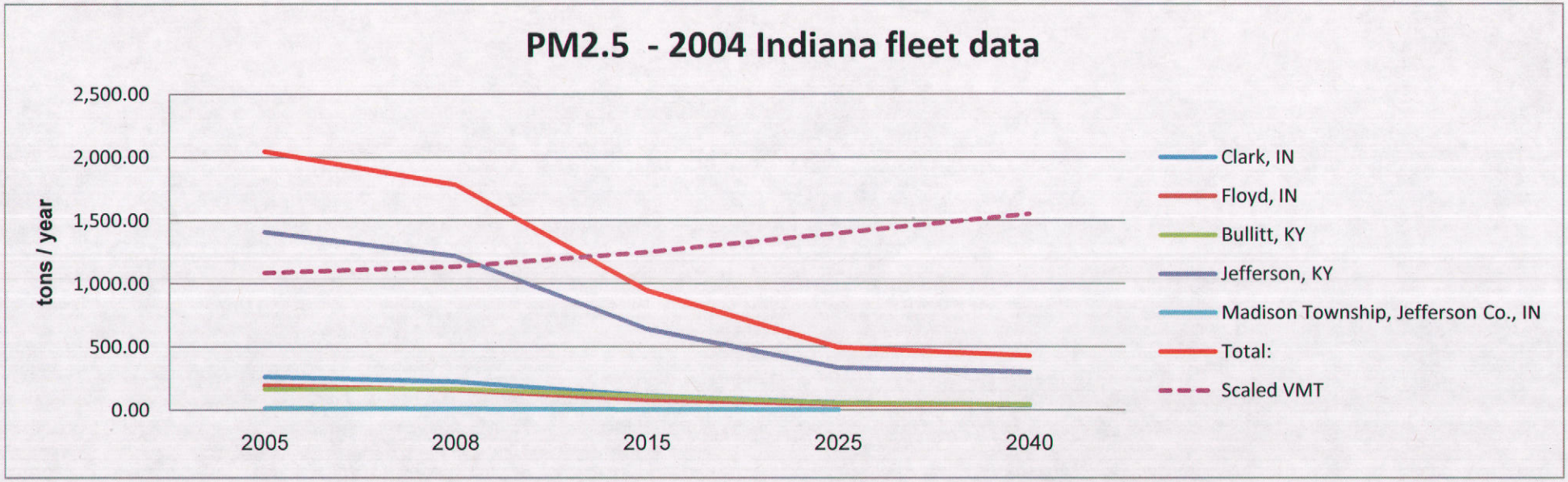
2009 INDIANA FLEET DATA

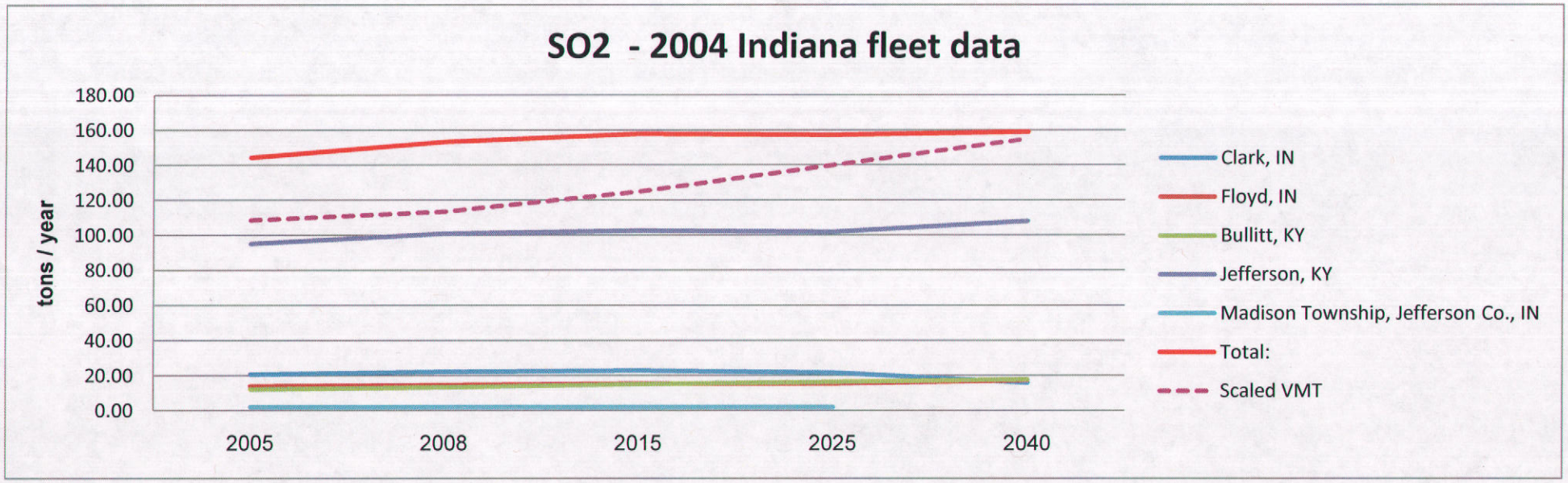
	2005	2008	2015	2025	2040
NOx					
Clark, IN	4,223.29	3,677.03	2,104.93	1,030.55	874.09
Floyd, IN	3,011.87	2,575.65	1,504.35	804.38	648.02
Bullitt, KY	2,952.07	2,820.80	1,782.71	948.69	771.30
Jefferson, KY	22,241.72	19,094.05	10,259.60	5,336.69	4797.67
Madison Township, Jefferson Co., IN	510.11	413.76	240.94	120.38	
Total:	32,939.07	28,581.28	15,892.52	8,240.69	7091.09
PM2.5					
Clark, IN	256.03	211.06	119.11	65.40	60.96
Floyd, IN	189.28	150.67	85.56	52.62	48.32
Bullitt, KY	165.41	167.76	107.96	54.78	45.85
Jefferson, KY	1,408.81	1,218.29	639.95	333.04	300.55
Madison Township, Jefferson Co., IN	14.95	11.43	5.57	2.94	
Total:	2,034.47	1,759.20	958.16	508.78	455.68
SO2					
Clark, IN	20.03	20.83	21.77	20.61	21.56

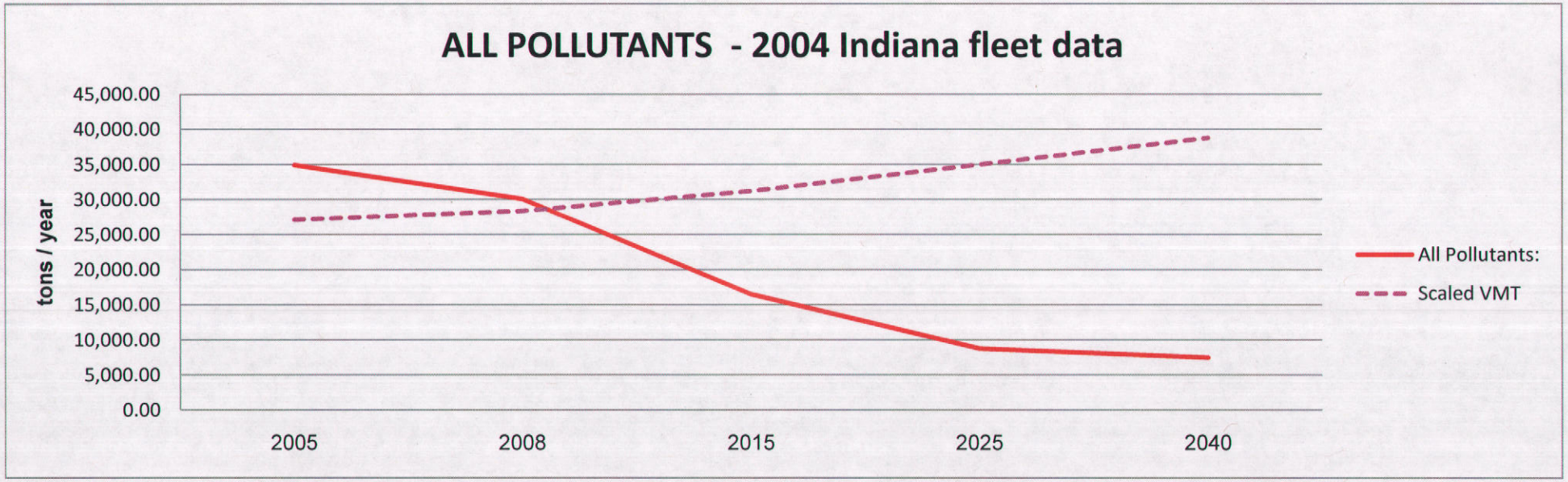
Floyd, IN	13.58	13.68	14.61	15.23	15.23
Bullitt, KY	12.11	13.28	15.01	16.33	17.77
Jefferson, KY	95.26	101.00	102.55	101.81	107.99
Madison Township, Jefferson Co., IN	2.11	2.07	2.01	2.04	
Total:	143.10	150.87	155.95	156.02	162.55
All Pollutants:	35,116.63	30,491.35	17,006.63	8,905.49	7,709.32

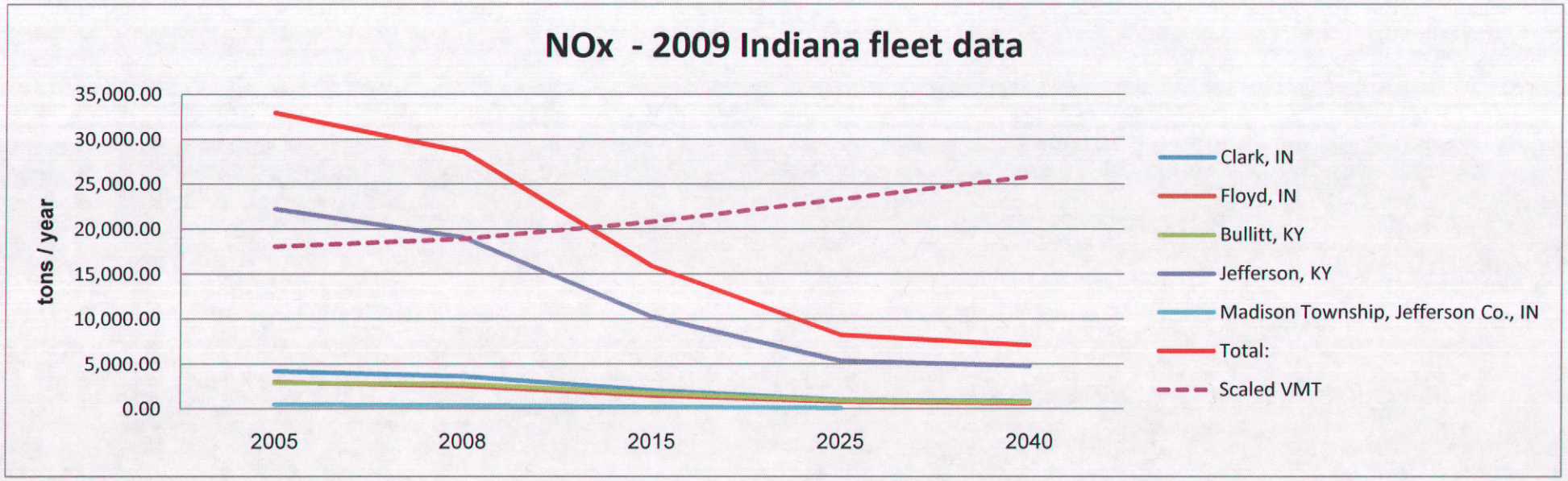
VMT:	10,852,277,299	11,347,241,232	12,470,739,328	13,982,952,546	15,500,457,256
Scaled VMT					
NOx	18,087	18,912	20,785	23,305	25,834
PM2.5	1,085	1,135	1,247	1,398	1,550
SO2	109	113	125	140	155
All Pollutants	27,131	28,368	31,177	34,957	38,751

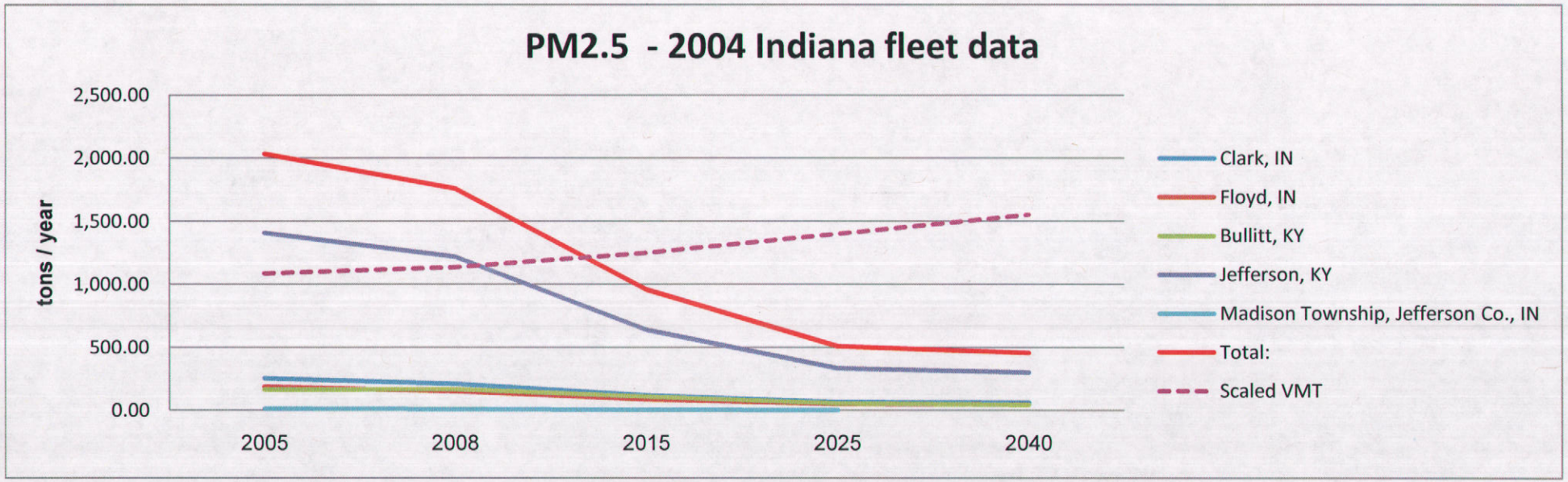

NOx - 2004 Indiana fleet data
tons / year
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT

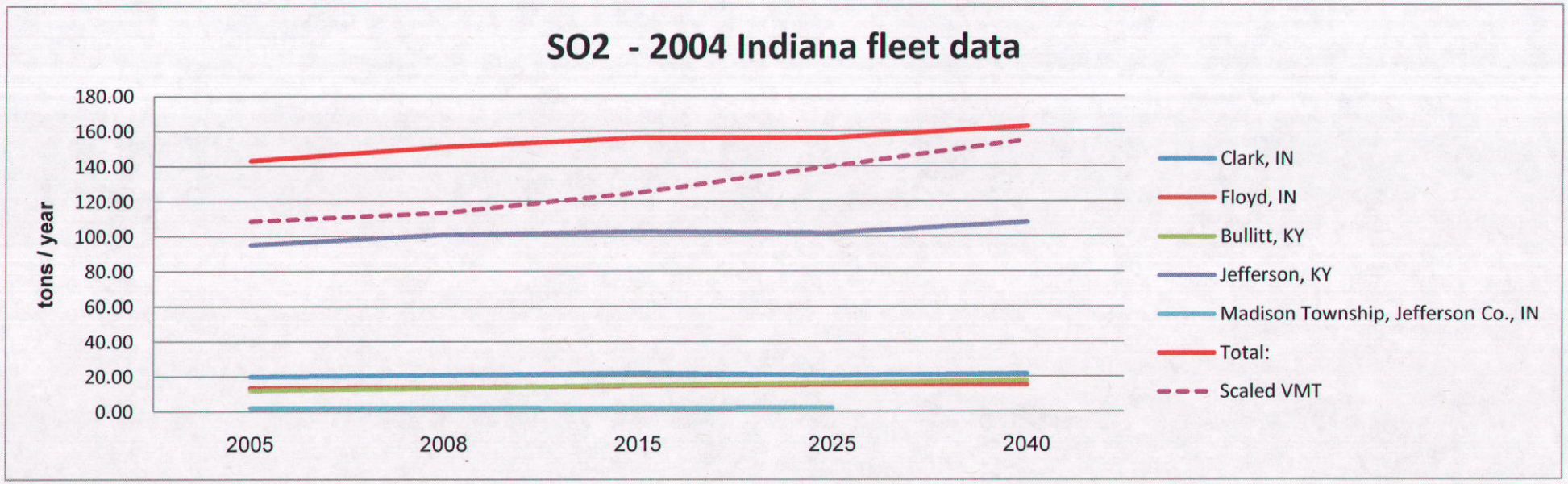

PM2.5 - 2004 Indiana fleet data
tons / year
2,500.00
2,000.00
1,500.00
1,000.00
500.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT

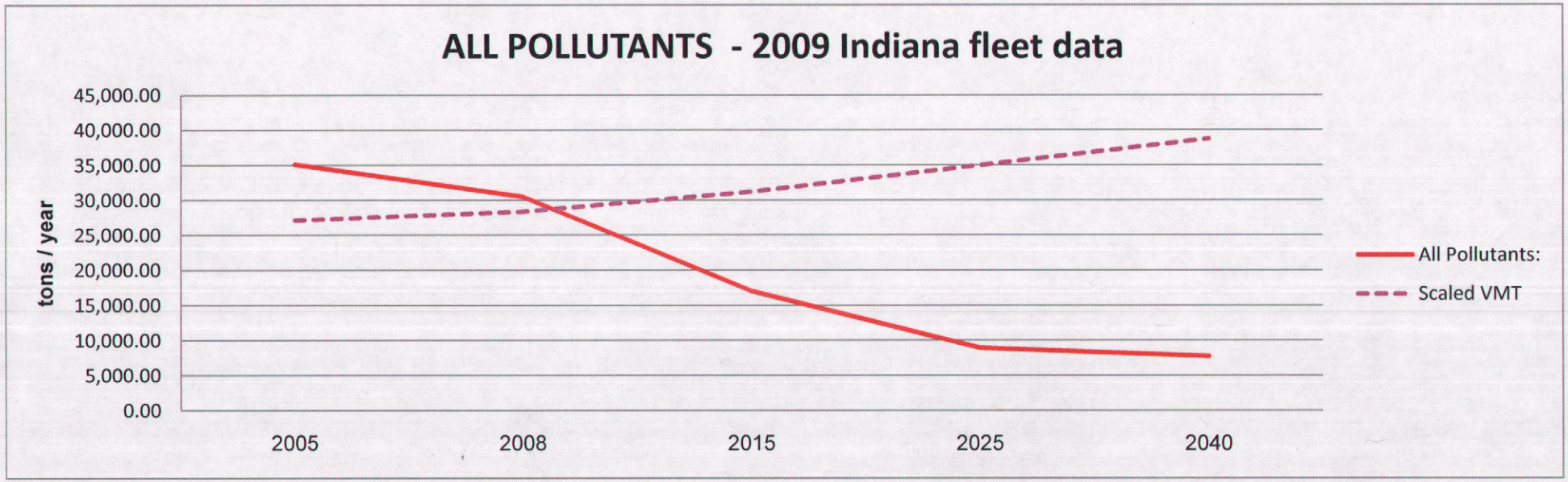

SO2 - 2004 Indiana fleet data
tons / year
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT

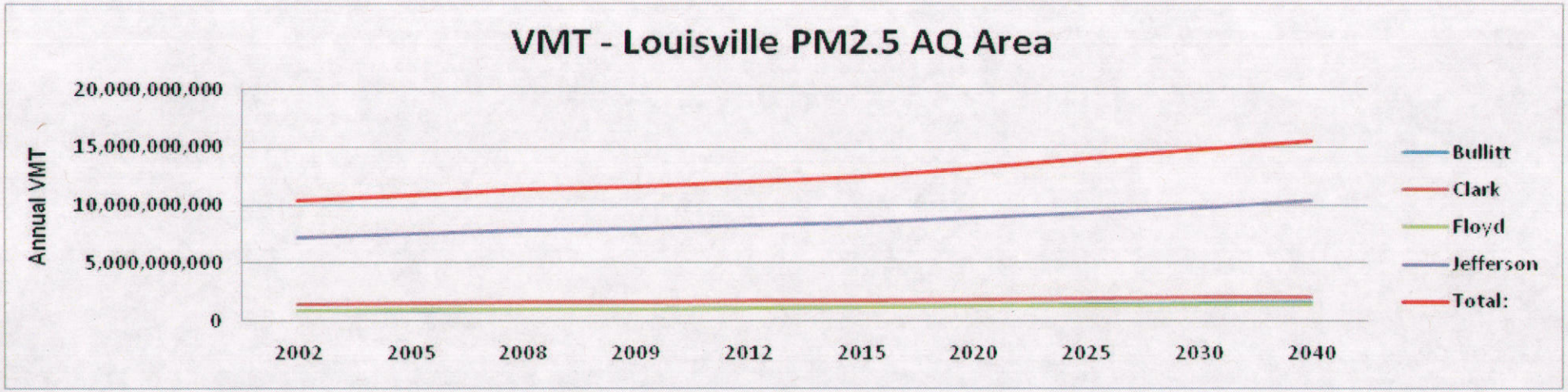

ALL POLLUTANTS - 2004 Indiana fleet data
tons / year
45,000.00
40,000.00
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2005
2008
2015
2025
2040
All Pollutants:
Scaled VMT


NOx - 2009 Indiana fleet data
tons / year
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT


PM2.5 - 2004 Indiana fleet data
tons / year
2,500.00
2,000.00
1,500.00
1,000.00
500.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT


SO2 - 2004 Indiana fleet data
tons / year
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
2005
2008
2015
2025
2040
Clark, IN
Floyd, IN
Bullitt, KY
Jefferson, KY
Madison Township, Jefferson Co., IN
Total:
Scaled VMT


ALL POLLUTANTS - 2009 Indiana fleet data
tons / year
45,000.00
40,000.00
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2005
2008
2015
2025
2040
All Pollutants:
Scaled VMT



VMT from KIPDA 10PlanA (July, 2010)

MOBILE6 vs. MOVES (2004 Indiana fleet data)

NOTE: data input conversions from MOBILE6 to MOVES can contribute to some of the variations

based on readily available data - Madison Township omitted

MOBILE6 --> MOVES (MOVES-MOBILE6)/MOBILE6

	2005			2008			2015			2025		
	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2	NOx	PM2.5	SO2
Clark, IN	3.50%	331.20%		6.29%	339.74%		10.91%	229.26%		14.77%	103.43%	
Floyd, IN	16.34%	389.66%		19.79%	392.16%		24.10%	261.61%		26.53%	128.05%	
Bullitt, KY	9.80%	354.87%		24.60%	422.39%		45.54%	360.60%		44.88%	161.12%	
Jefferson, KY	7.98%	357.00%		13.24%	361.72%		19.29%	264.70%		26.30%	136.20%	
Madison Township, Jefferson Co., IN	--	--	--	--	--	--	--	--	--	--	--	--
Total:	**8.25%**	**356.18%**	**--**	**13.91%**	**366.47%**	**--**	**21.15%**	**268.50%**	**--**	**26.70%**	**133.42%**	**--**

NOx	2002	2005	2008	2009	2012	2015	2020	2	2030
Clark, IN	4,695.8	3,968.1	3,240.3	2,997.7	2,113.8	1,662.5	910.2	849.6	789.0
Floyd, IN	3,023.3	2,512.5	2,001.6	1,831.4	1,305.5	1,052.9	632.0	574.4	516.7
Bullitt, KY	3,113.2	2,688.5	2,263.8	2,122.3	1,531.6	1,224.9	713.8	654.8	595.8
Jefferson, KY	24,335.6	20,598.7	16,861.7	15,616.0	10,922.7	8,600.3	4,729.6	4,225.4	3,721.2
Totals:	35,168.0	29,767.8	24,367.5	22,567.4	15,873.6	12,540.6	6,985.7	6,304.2	5,622.8

PM2.5	2002	2005	2008	2009	2012	2015	2020	2025	2030
Clark, IN	70.8	61.1	51.4	48.1	38.1	34.1	27.5	28.9	30.3
Floyd, IN	46.7	39.5	32.4	30.0	24.0	22.3	19.3	19.7	20.1
Bullitt, KY	40.6	36.4	32.1	30.7	25.6	23.4	19.8	21.0	22.1
Jefferson, KY	352.7	308.3	263.9	249.1	197.5	175.5	138.8	141.0	143.2
Totals:	510.8	445.3	379.7	357.9	285.2	255.3	205.4	210.6	215.8

vvv from data below vvvv

Louisville Metro APCD 07/21/2010 RCB

APCD Onroad Mobile emissions estimates for July 2010 annual PM2.5 TIP Conformity using countywide VMT and emission factors

County	VMT from KIPDA TDM Current July 2010			MOBILE6 Emission Factors From APCD suite A_M6SEG6				Use to compare with MOVES totals				County Emissions							
	Year	KIPDA VMT/day	VMT/Year	VOC g/mi	CO g/mi	NOx g/mi	PM 2.5 g/mi	VOC tons/yr	CO tons/yr	NOx tons/yr	PM 2.5 tons/yr	VOC kg/day	CO kg/day	NOx kg/day	PM 2.5 kg/day	VOC TPD	CO TPD	NOx TPD	PM 2.5 TPD
Bullitt, KY	2002	2238270	816968550	1.2100	19.6030	3.4570	0.0451	1,089.7	17,653.5	3,113.2	40.6	2708	43877	7738	101	2.99	48.37	8.53	0.11
Clark, IN	2002	3826639	1396723235	1.2280	18.3230	3.0500	0.0460	1,890.7	28,210.5	4,695.8	70.8	4699	70116	11671	176	5.18	77.29	12.87	0.19
Floyd, IN	2002	2519037	919448505	1.2700	18.5030	2.9830	0.0461	1,287.2	18,753.1	3,023.3	46.7	3199	46610	7514	116	3.53	51.38	8.28	0.13
Jefferson, KY	2002	19792141	7224131465	1.0870	16.2620	3.0560	0.0443	8,656.0	129,498.1	24,335.6	352.7	21514	321860	60485	877	23.71	354.78	66.67	0.97
Oldham, KY	2002	1279567		1.2020	18.7510	3.3000	0.0449					1538	23993	4223	57	1.70	26.45	4.65	0.06
5-County Area	2002	29655654										33659	506455	91631	1327	37.10	558.26	101.00	1.46
PM2.5 NAA	2002	28376087	10357271755					12,923.5	194,115.2	35,168.0	510.8	32121	482462	87408	1270	35.41	531.81	96.35	1.40
8-Hr O3 NAA	2002	29655654										33659	506455	91631	1327	37.10	558.26	101.00	1.46
Bullitt, KY	2009	2666700	973345500	0.7590	12.4140	1.9780	0.0286	814.4	13,319.3	2,122.3	30.7	2024	33104	5275	76	2.23	36.49	5.81	0.08
Clark, IN	2009	4408713	1609180245	0.7880	12.1360	1.6900	0.0271	1,397.8	21,527.0	2,997.7	48.1	3474	53504	7451	120	3.83	58.98	8.21	0.13
Floyd, IN	2009	2745316	1002040340	0.8040	12.1190	1.6580	0.0272	888.1	13,386.2	1,831.4	30.0	2207	33270	4552	75	2.43	36.67	5.02	0.08
Jefferson, KY	2009	21719502	7927618230	0.7440	11.4520	1.7870	0.0285	6,501.6	100,075.5	15,616.0	249.1	16159	248732	38813	619	17.81	274.18	42.78	0.68
Oldham, KY	2009	1510251		0.7590	11.9970	1.8930	0.0286					1146	18118	2859	43	1.26	19.97	3.15	0.05
5-County Area	2009	33050482										25011	386729	58949	933	27.57	426.29	64.98	1.03
PM2.5 NAA	2009	31540231	11512184315					9,601.8	148,308.0	22,567.4	357.9	23865	368611	56090	889	26.31	406.32	61.83	0.98
8-Hr O3 NAA	2009	33050482										25011	386729	58949	933	27.57	426.29	64.98	1.03
Bullitt, KY	2012	2908051	1061438615	0.6050	10.7140	1.3090	0.0219	707.9	12,535.7	1,531.6	25.6	1759	31157	3807	64	1.94	34.34	4.20	0.07
Clark, IN	2012	4624798	1688051270	0.6240	10.4850	1.1360	0.0205	1,161.1	19,510.0	2,113.8	38.1	2886	48491	5254	95	3.18	53.45	5.79	0.10
Floyd, IN	2012	2910073	1062176645	0.6400	10.4310	1.1150	0.0205	749.3	12,213.1	1,305.5	24.0	1862	30355	3245	60	2.05	33.46	3.58	0.07
Jefferson, KY	2012	22547866	8229971090	0.5880	9.9580	1.2040	0.0218	5,334.3	90,338.8	10,922.7	197.5	13258	224532	27148	491	14.61	247.50	29.92	0.54
Oldham, KY	2012	1620079		0.5990	10.4020	1.2690	0.0219					970	16852	2056	35	1.07	18.58	2.27	0.04
5-County Area	2012	34610867										20736	351387	41509	744	22.86	387.33	45.75	0.82
PM2.5 NAA	2012	32990788						7,952.6	134,597.7	15,873.6	285.2	19766	334534	39453	709	21.79	368.75	43.49	0.78
8-Hr O3 NAA	2012	34610867										20736	351387	41509	744	22.86	387.33	45.75	0.82

Louisville Metro APCD 07/21/2010 RCB

APCD Onroad M[illegible] emissions estimates for July 2010 annual PM2.5 TIP Conformity using countywide VMT and emis[illegible] factors

County	VMT from KIPDA TDM Current July 2010			MOBILE6 Emission Factors From APCD suite A_M6SEG6								County Emissions							
	Year	KIPDA VMT/day		VOC g/mi	CO g/mi	NOx g/mi	PM 2.5 g/mi					VOC kg/day	CO kg/day	NOx kg/day	PM 2.5 kg/day	VOC TPD	CO TPD	NOx TPD	PM 2.5 TPD
Bullitt, KY	2020	3465115	1264766975	0.3840	8.7750	0.5120	0.0142	535.4	12,233.8	713.8	19.8	1331	30406	1774	49	1.47	33.52	1.96	0.05
Clark, IN	2020	4917888	1795029120	0.4000	8.5880	0.4600	0.0139	791.5	16,992.9	910.2	27.5	1967	42235	2262	68	2.17	46.56	2.49	0.08
Floyd, IN	2020	3452527	1260172355	0.4040	8.5310	0.4550	0.0139	561.2	11,850.4	632.0	19.3	1395	29454	1571	48	1.54	32.47	1.73	0.05
Jefferson, KY	2020	24287700	8865010500	0.3710	8.2010	0.4840	0.0142	3,625.4	80,140.1	4,729.6	138.8	9011	199183	11755	345	9.93	219.56	12.96	0.38
Oldham, KY	2020	1908968		0.3770	8.5020	0.4960	0.0142					720	16230	947	27	0.79	17.89	1.04	0.03
5-County Area	2020	38032198										14423	317508	18309	538	15.90	349.99	20.18	0.59
PM2.5 NAA	2020	36123230	13184978950					5,513.4	121,217.2	6,985.7	205.4	13703	301278	17363	511	15.11	332.10	19.14	0.56
8-Hr O3 NAA	2020	38032198										14423	317508	18309	538	15.90	349.99	20.18	0.59
Bullitt, KY	2030	4136497	1509821405	0.3400	8.3930	0.3580	0.0133	565.9	13,968.4	595.8	22.1	1406	34718	1481	55	1.55	38.27	1.63	0.06
Clark, IN	2030	5734310	2093023150	0.3620	8.2790	0.3420	0.0131	835.2	19,101.0	789.0	30.3	2076	47474	1961	75	2.29	52.33	2.16	0.08
Floyd, IN	2030	3811110	1391055150	0.3590	8.1740	0.3370	0.0131	550.5	12,533.8	516.7	20.1	1368	31152	1284	50	1.51	34.34	1.42	0.06
Jefferson, KY	2030	26808090	9784952850	0.3290	7.8820	0.3450	0.0133	3,548.6	85,015.7	3,721.2	143.2	8820	211301	9249	356	9.72	232.92	10.19	0.39
Oldham, KY	2030	2282428		0.3330	8.1220	0.3490	0.0133					760	18538	797	30	0.84	20.43	0.88	0.03
5-County Area	2030	42772435										14430	343183	14772	567	15.91	378.29	16.28	0.62
PM2.5 NAA	2030	40490007	14778852555					5,500.1	130,618.8	5,622.8	215.8	13670	324645	13975	536	15.07	357.85	15.40	0.59
8-Hr O3 NAA	2030	42772435										14430	343183	14772	567	15.91	378.29	16.28	0.62