

Simple Interactive Models for Better Air Quality

Road Transport in India 2010-30

Emissions, Pollution & Health Impacts

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November, 2012

Annex Material

Total Emissions by City

Year 2010 Business As Usual

Analysis & errors are sole responsibility of the authors.

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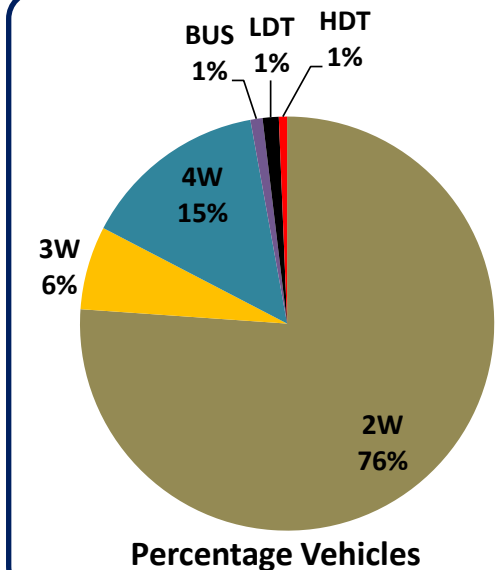
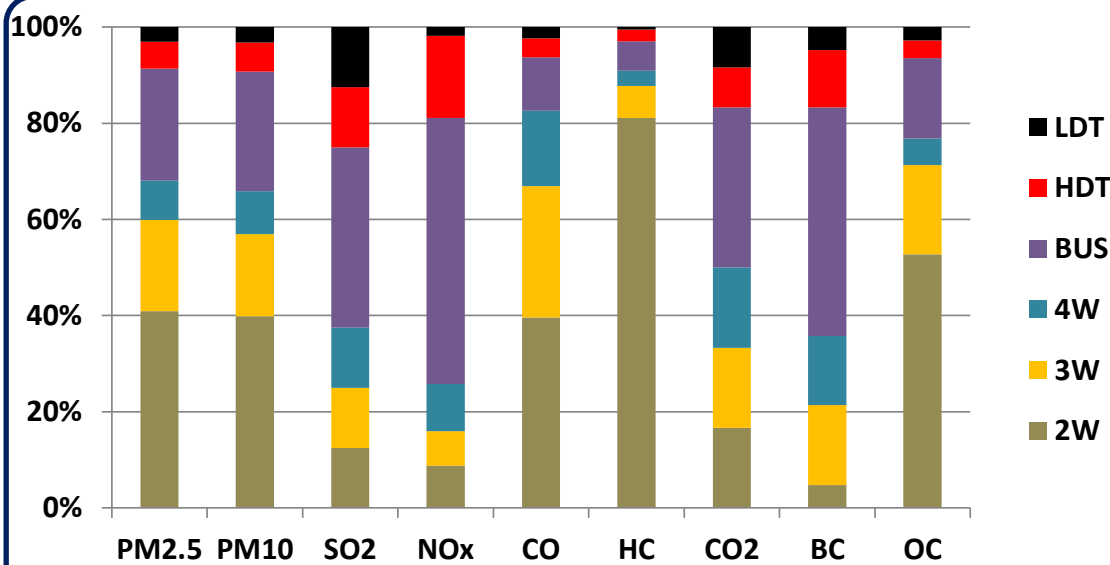


New Delhi, India

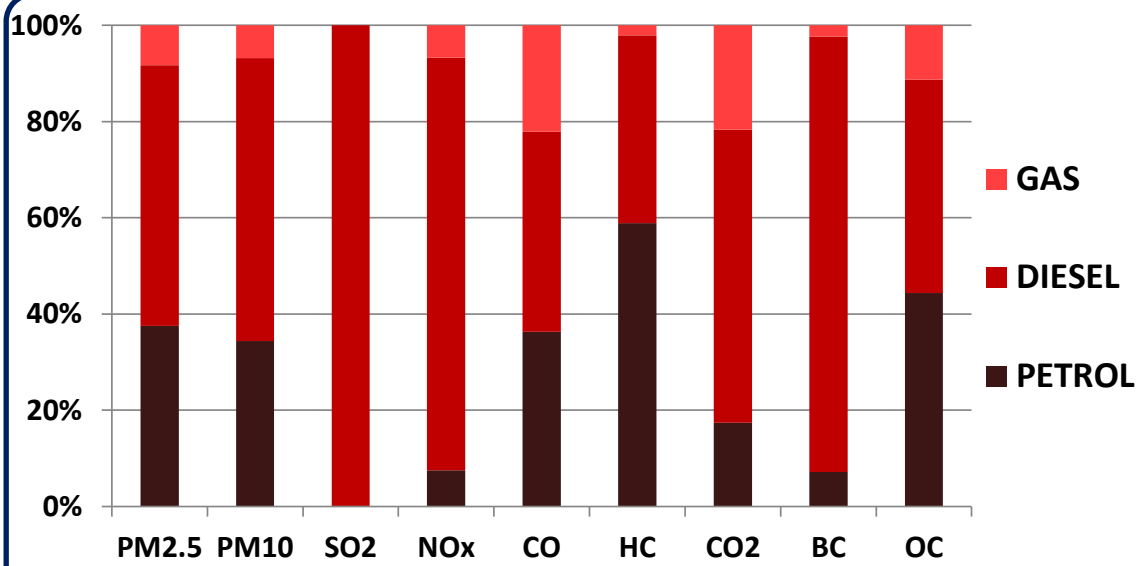
2010

CITY: AHMEDABAD

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	950	440	190	540	130	70	2,290	tons
PM10	1,120	480	250	700	170	90	2,780	tons
SO2	10	10	10	30	10	10	50	tons
NOx	1,620	1,320	1,810	10,210	3,150	340	18,430	tons
CO	16,060	11,080	6,380	4,500	1,600	950	40,550	tons
VOC	17,500	1,430	690	1,320	520	110	21,540	tons
CO2	0.4	0.4	0.4	0.8	0.2	0.2	2.2	mill tons
BC	20	70	60	200	50	20	400	tons
OC	570	200	60	180	40	30	1,050	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	860	1,240	190	-	2,290
PM10 (tons)	960	1,640	190	-	2,780
SO2 (tons)	-	50	-	-	50
NOx (tons)	1,380	15,820	1,240	-	18,430
CO (tons)	14,720	16,880	8,970	-	40,550
VOC (tons)	12,690	8,400	460	-	21,540
CO2 (mil tons)	0.4	1.4	0.5	-	2.2
BC (tons)	30	380	10	-	400
OC (tons)	470	470	120	-	1,050

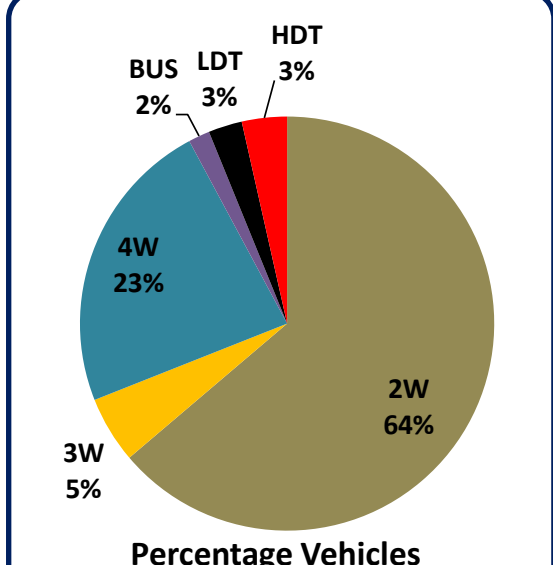
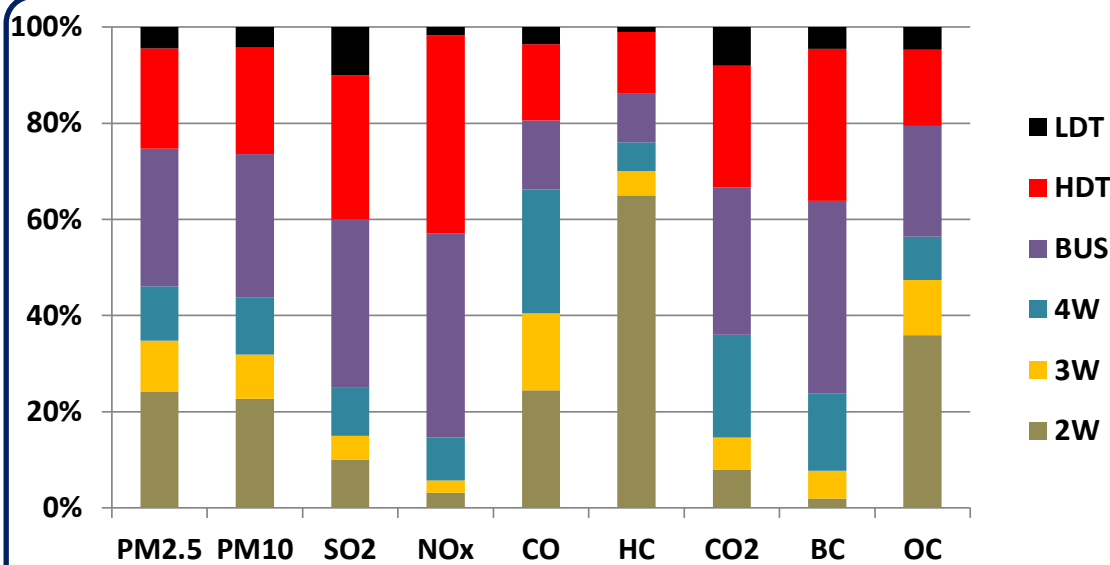


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

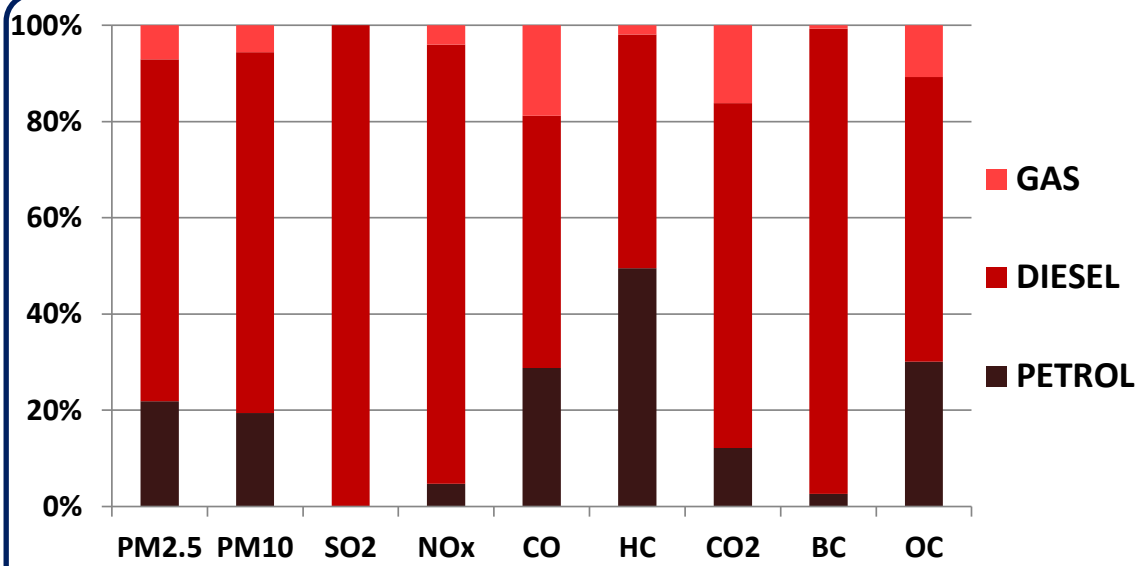
2010

CITY: BENGALURU

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	1,400	620	660	1,660	1,210	260	5,790	tons
PM10	1,660	670	870	2,170	1,620	310	7,280	tons
SO2	20	10	20	70	60	20	170	tons
NOx	2,400	1,860	6,760	31,840	30,940	1,270	75,050	tons
CO	23,820	15,680	25,080	14,040	15,400	3,500	97,490	tons
VOC	25,950	2,030	2,370	4,100	5,080	390	39,900	tons
CO2	0.6	0.5	1.6	2.3	1.9	0.6	7.3	mill tons
BC	30	90	250	620	490	70	1,530	tons
OC	840	270	210	540	370	110	2,310	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	1,270	4,120	410	-	5,790
PM10 (tons)	1,410	5,460	410	-	7,280
SO2 (tons)	-	170	-	-	170
NOx (tons)	3,540	68,510	3,010	-	75,050
CO (tons)	28,030	51,120	18,350	-	97,490
VOC (tons)	19,760	19,380	780	-	39,900
CO2 (mil tons)	0.9	5.3	1.2	-	7.3
BC (tons)	40	1,480	10	-	1,530
OC (tons)	700	1,380	250	-	2,310

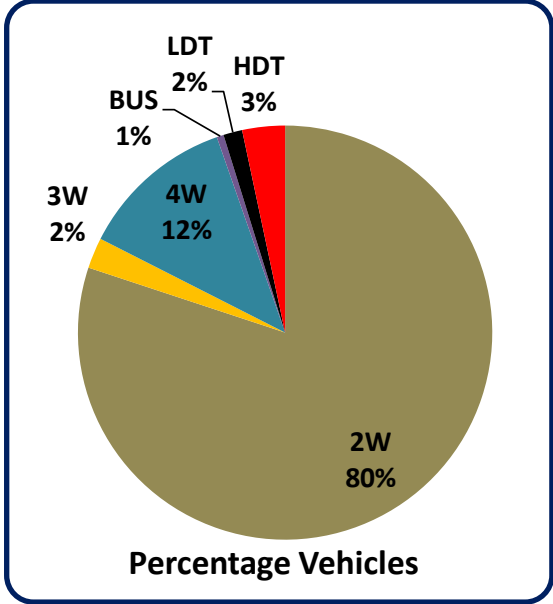
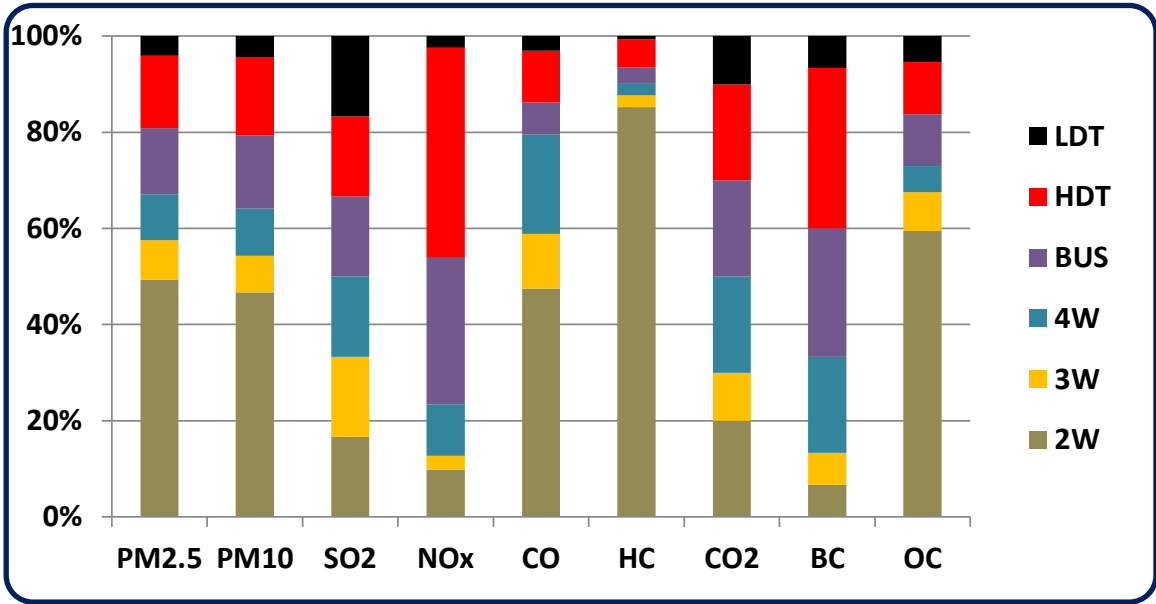


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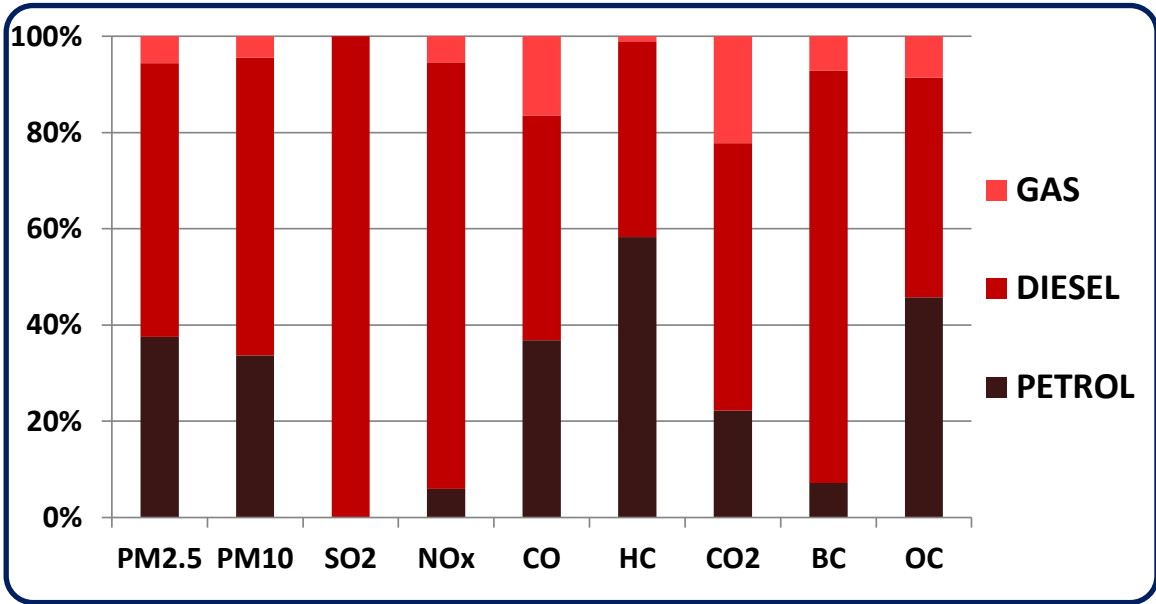
2010

CITY: BHOPAL

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	360	60	70	100	110	30	720	tons
PM10	430	70	90	140	150	40	880	tons
SO2	10	10	10	10	10	10	20	tons
NOx	620	180	670	1,920	2,750	150	6,260	tons
CO	6,090	1,460	2,650	850	1,380	390	12,800	tons
VOC	6,640	190	200	250	460	50	7,760	tons
CO2	0.2	0.1	0.2	0.2	0.2	0.1	0.7	mill tons
BC	10	10	30	40	50	10	130	tons
OC	220	30	20	40	40	20	340	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	270	410	40	-	720
PM10 (tons)	300	550	40	-	880
SO2 (tons)	-	20	-	-	20
NOx (tons)	370	5,560	340	-	6,260
CO (tons)	4,720	5,980	2,110	-	12,800
VOC (tons)	4,530	3,160	80	-	7,760
CO2 (mil tons)	0.2	0.5	0.2	-	0.7
BC (tons)	10	120	10	-	130
OC (tons)	160	160	30	-	340

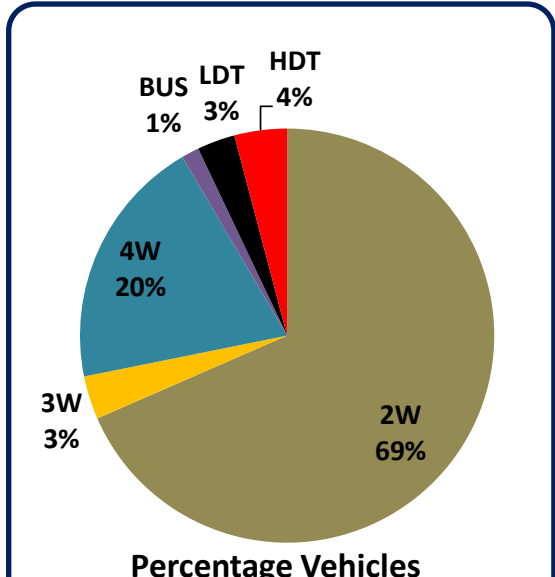
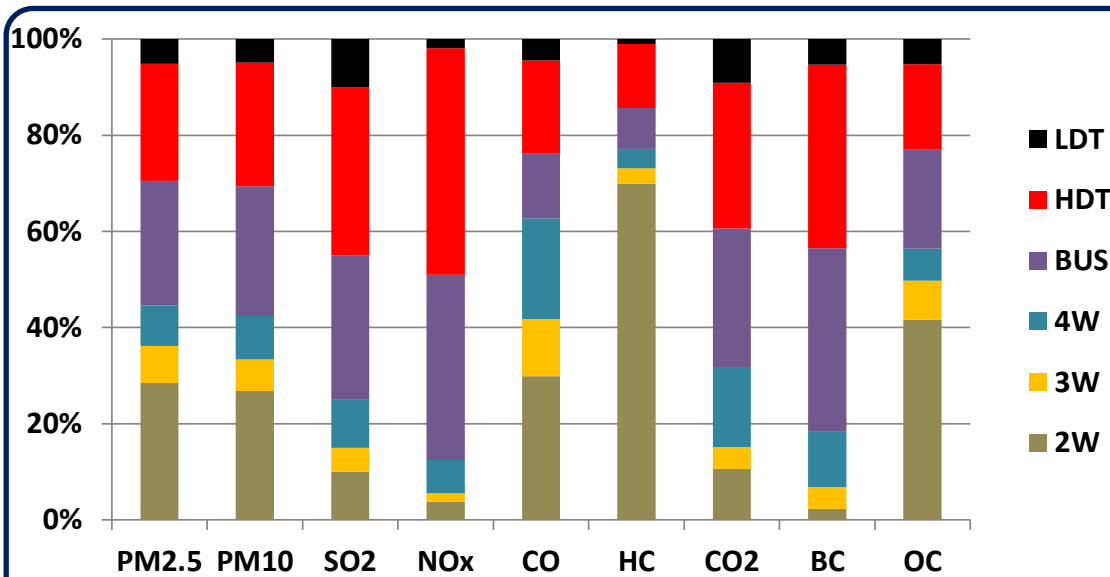


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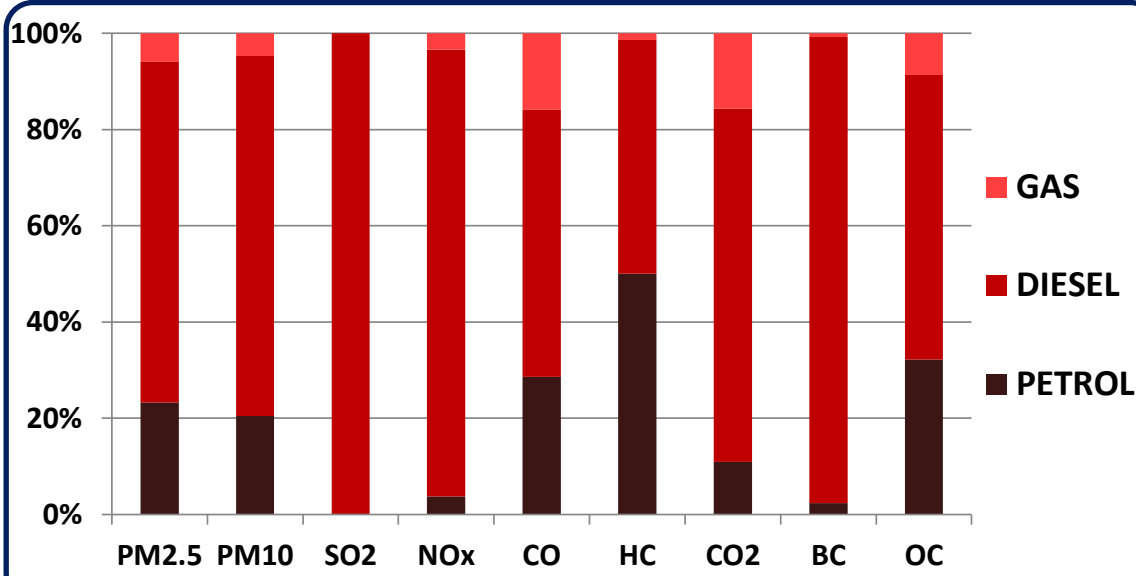
2010

CITY: CHENNAI

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	1,450	390	430	1,320	1,240	260	5,070	tons
PM10	1,720	420	580	1,730	1,650	310	6,380	tons
SO2	20	10	20	60	70	20	150	tons
NOx	2,490	1,170	4,540	25,360	31,000	1,270	65,810	tons
CO	24,690	9,820	17,320	11,180	15,920	3,660	82,570	tons
VOC	26,900	1,270	1,540	3,270	5,120	400	38,470	tons
CO2	0.7	0.3	1.1	1.9	2.0	0.6	6.3	mill tons
BC	30	60	150	500	500	70	1,280	tons
OC	870	170	140	430	370	110	2,070	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	1,180	3,600	300	-	5,070
PM10 (tons)	1,310	4,780	300	-	6,380
SO2 (tons)	-	150	-	-	150
NOx (tons)	2,470	61,080	2,270	-	65,810
CO (tons)	23,590	45,900	13,090	-	82,570
VOC (tons)	19,260	18,690	530	-	38,470
CO2 (mil tons)	0.7	4.7	1.0	-	6.3
BC (tons)	30	1,250	10	-	1,280
OC (tons)	670	1,230	180	-	2,070

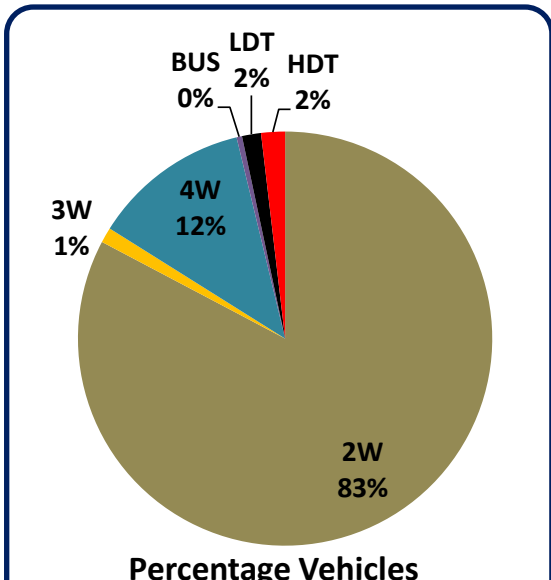
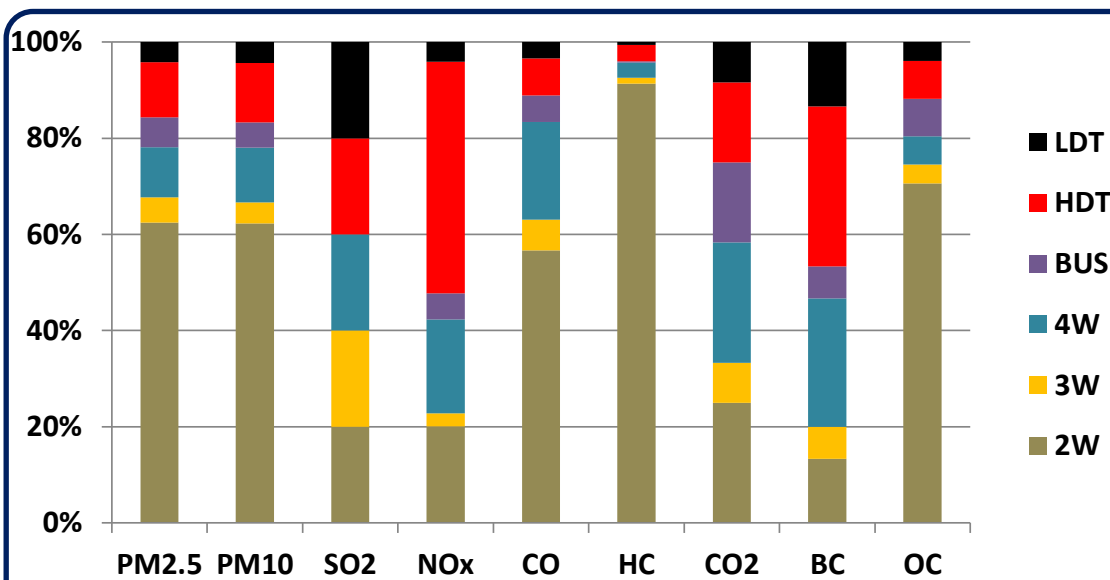


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

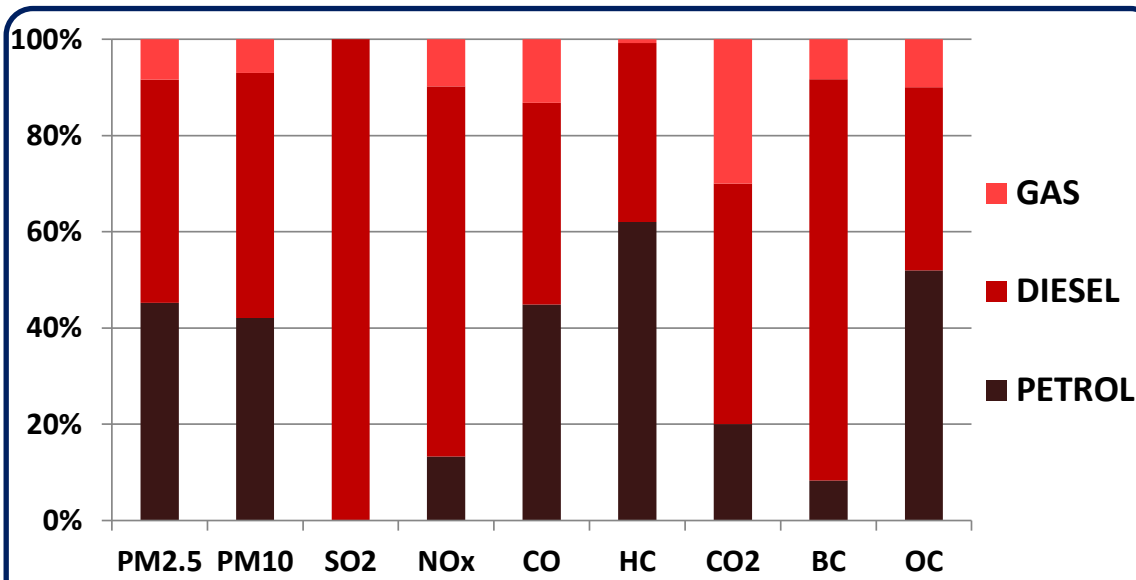
2010

CITY: COIMBATORE

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	600	50	100	60	110	40	940	tons
PM10	710	50	130	60	140	50	1,130	tons
SO2	10	10	10	-	10	10	20	tons
NOx	1,030	140	1,000	280	2,470	210	5,110	tons
CO	10,230	1,150	3,660	1,000	1,390	610	18,010	tons
VOC	11,140	150	380	30	420	70	12,170	tons
CO2	0.3	0.1	0.3	0.2	0.2	0.1	0.9	mill tons
BC	20	10	40	10	50	20	110	tons
OC	360	20	30	40	40	20	490	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	430	440	80	-	940
PM10 (tons)	480	580	80	-	1,130
SO2 (tons)	-	20	-	-	20
NOx (tons)	680	3,930	500	-	5,110
CO (tons)	8,080	7,560	2,380	-	18,010
VOC (tons)	7,560	4,530	90	-	12,170
CO2 (mil tons)	0.2	0.5	0.3	-	0.9
BC (tons)	10	100	10	-	110
OC (tons)	260	190	50	-	490

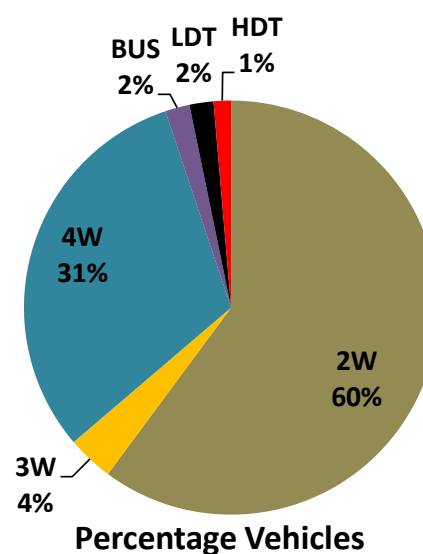
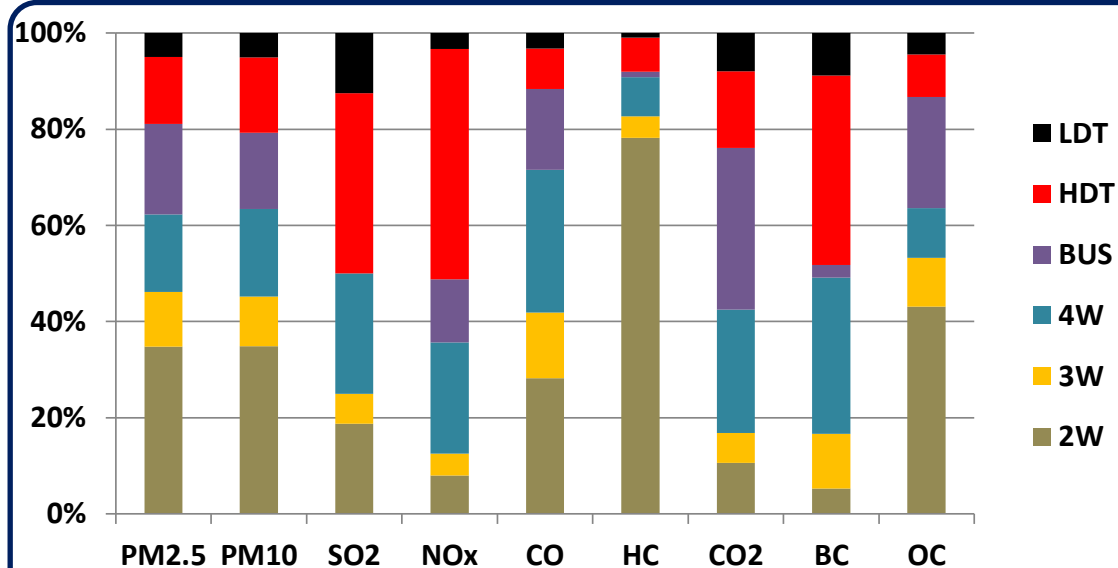


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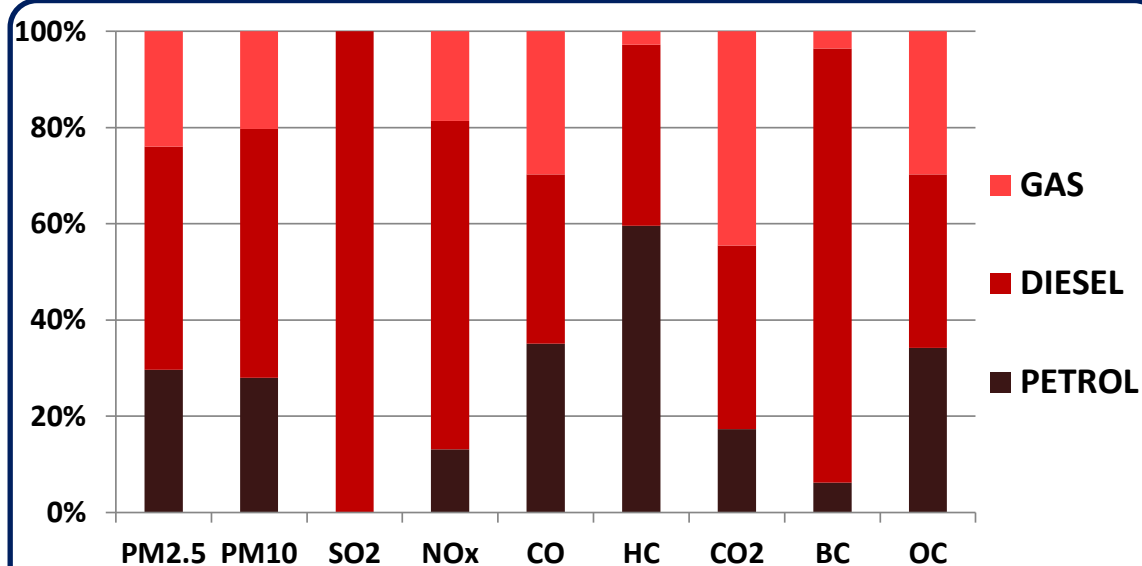
2010

CITY: DELHI

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	2,760	900	1,280	1,490	1,110	390	7,910	tons
PM10	3,270	970	1,700	1,490	1,470	470	9,360	tons
SO2	30	10	40	-	60	20	140	tons
NOx	4,750	2,700	13,670	7,810	28,350	1,950	59,200	tons
CO	47,070	22,690	49,440	28,110	14,010	5,290	166,590	tons
VOC	51,280	2,930	5,330	790	4,650	590	65,550	tons
CO2	1.2	0.7	2.9	3.8	1.8	0.9	10.9	mill tons
BC	60	130	370	30	450	100	1,120	tons
OC	1,660	390	400	890	340	170	3,820	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	2,350	3,670	1,900	-	7,910
PM10 (tons)	2,620	4,850	1,900	-	9,360
SO2 (tons)	-	140	-	-	140
NOx (tons)	7,770	40,420	11,020	-	59,200
CO (tons)	58,480	58,550	49,570	-	166,590
VOC (tons)	39,050	24,700	1,810	-	65,550
CO2 (mil tons)	1.9	4.2	4.9	-	10.9
BC (tons)	70	1,020	40	-	1,120
OC (tons)	1,310	1,380	1,140	-	3,820

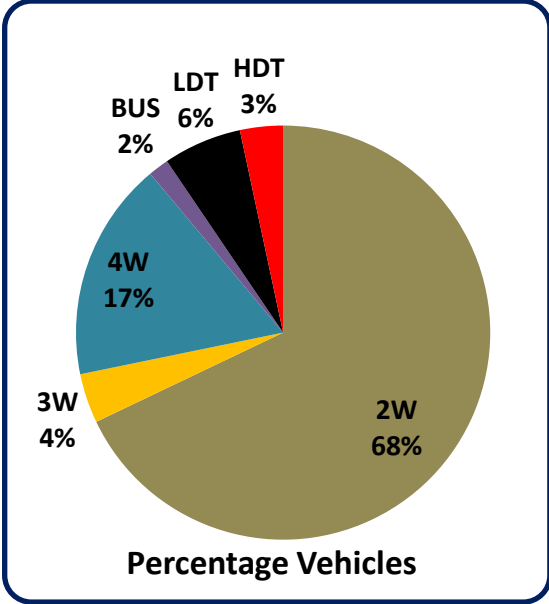
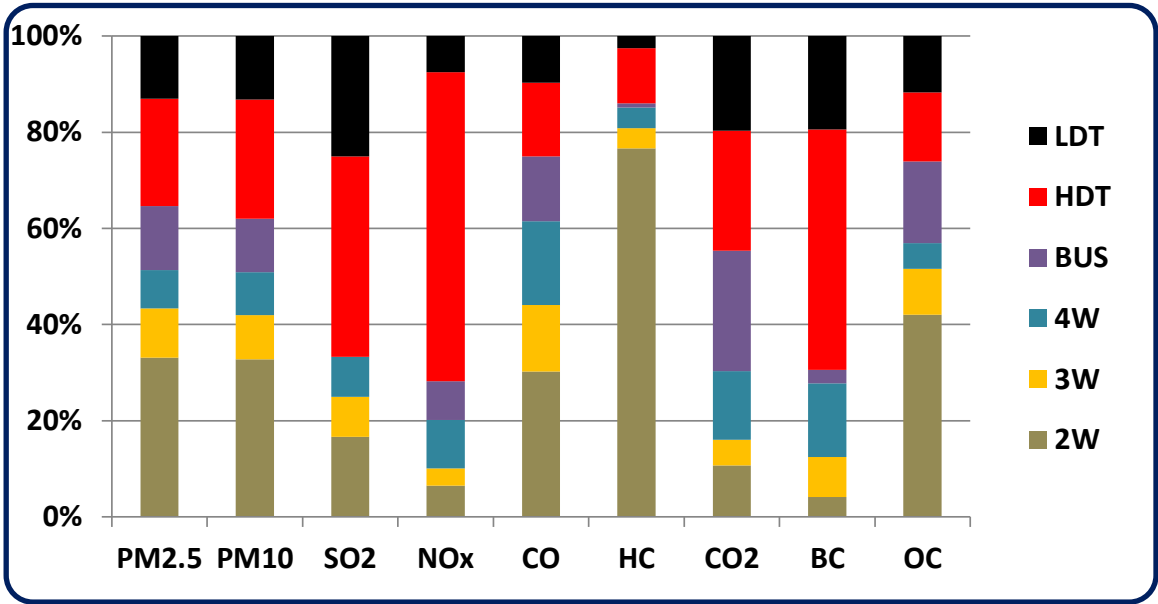


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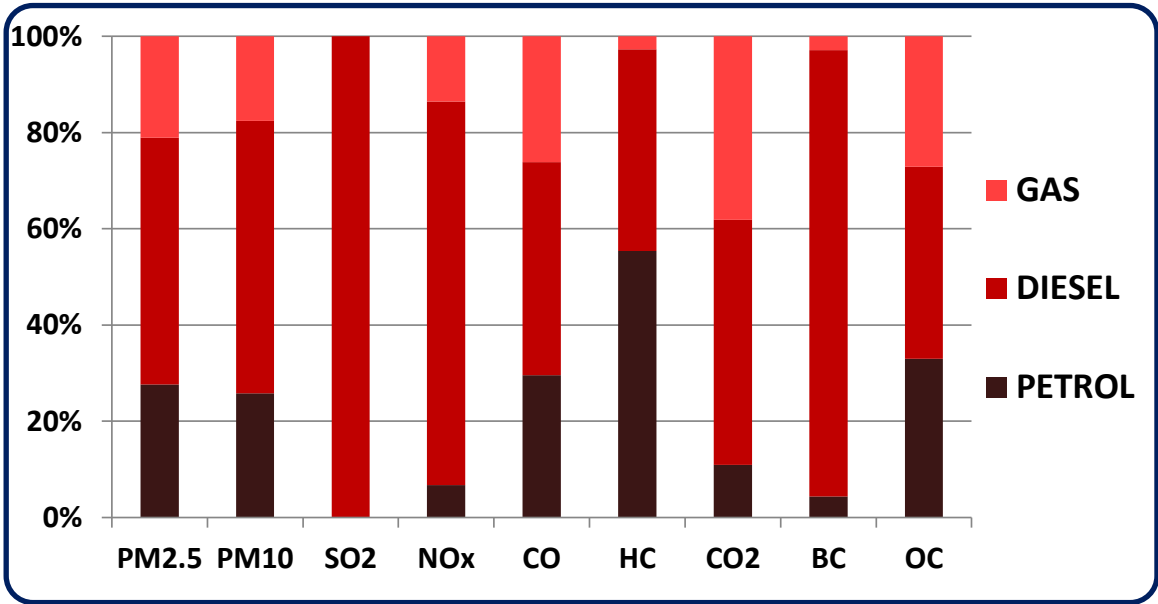
2010

CITY: HYDERABAD

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	1,320	410	320	530	890	520	3,970	tons
PM10	1,570	440	430	530	1,190	630	4,760	tons
SO2	20	10	10	-	50	30	90	tons
NOx	2,270	1,220	3,510	2,780	22,310	2,590	34,660	tons
CO	22,470	10,280	12,910	10,000	11,420	7,170	74,220	tons
VOC	24,490	1,330	1,370	280	3,690	790	31,920	tons
CO2	0.6	0.3	0.8	1.4	1.4	1.1	5.4	mill tons
BC	30	60	110	20	360	140	690	tons
OC	790	180	100	320	270	220	1,860	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	1,100	2,040	840	-	3,970
PM10 (tons)	1,230	2,700	840	-	4,760
SO2 (tons)	-	90	-	-	90
NOx (tons)	2,330	27,630	4,710	-	34,660
CO (tons)	21,910	32,900	19,420	-	74,220
VOC (tons)	17,680	13,390	870	-	31,920
CO2 (mil tons)	0.6	2.8	2.1	-	5.4
BC (tons)	30	640	20	-	690
OC (tons)	620	750	510	-	1,860

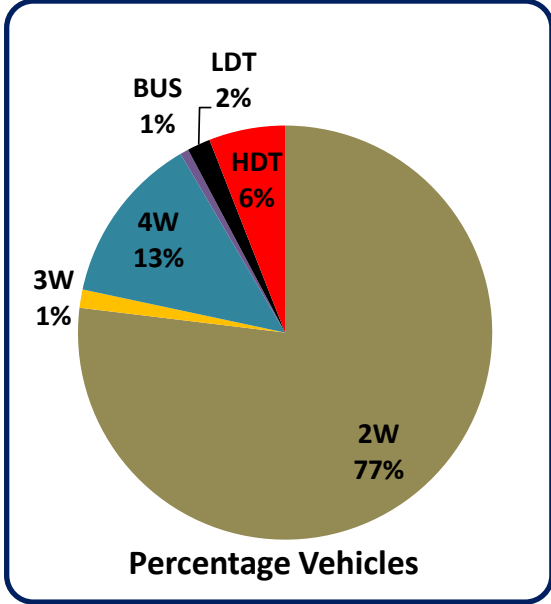
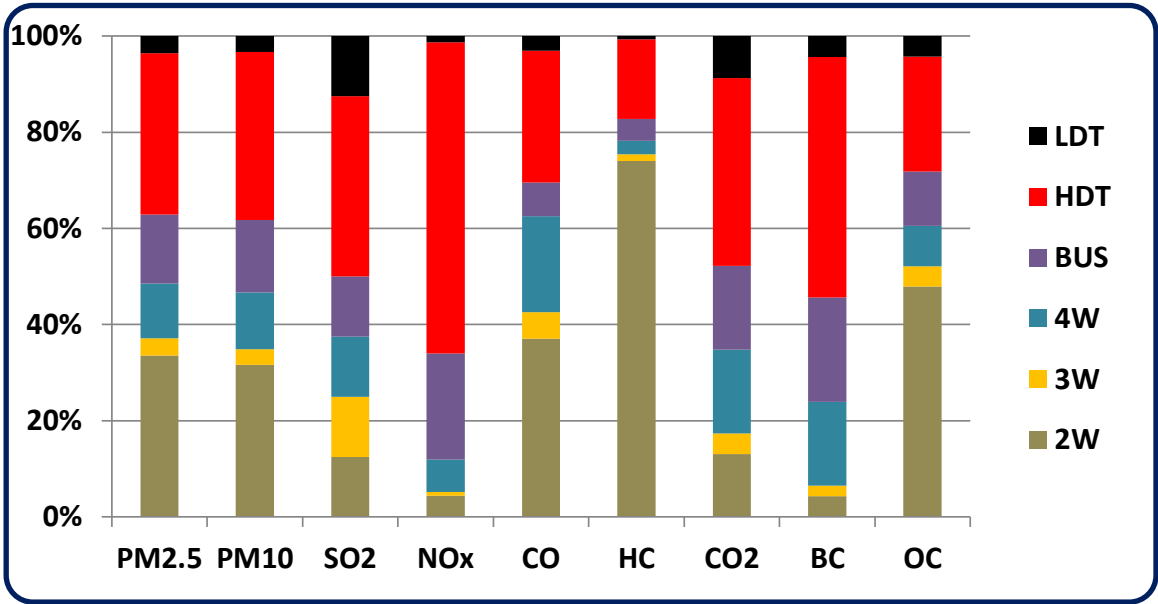


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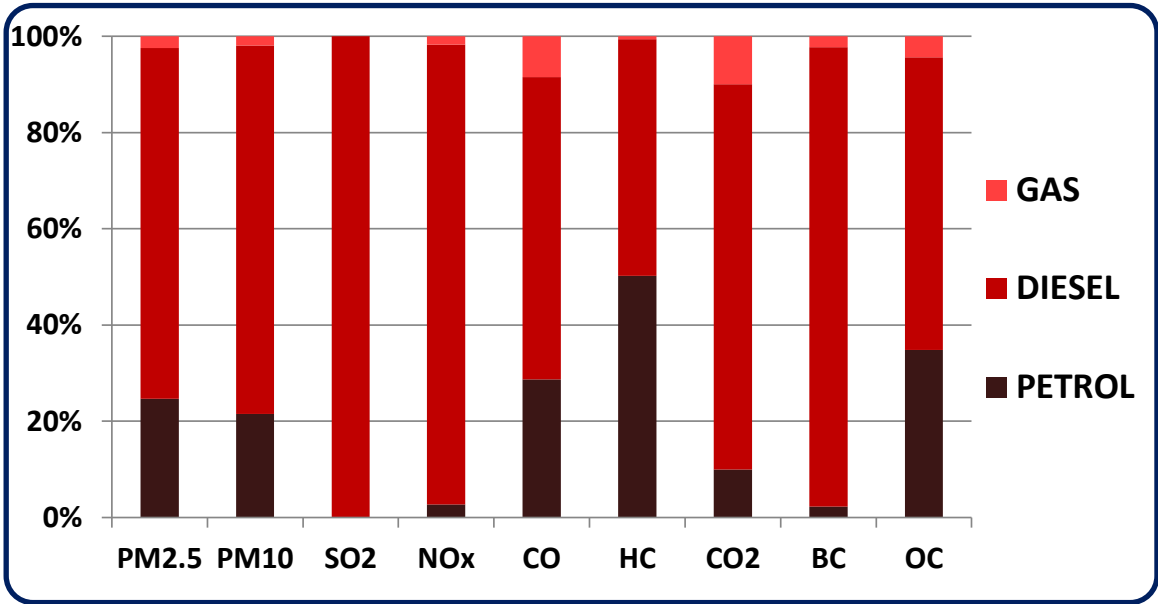
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CITY: INDORE

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	560	60	190	240	560	60	1,650	tons
PM10	670	70	250	320	740	70	2,090	tons
SO2	10	10	10	10	30	10	50	tons
NOx	960	170	1,480	4,830	14,140	290	21,840	tons
CO	9,530	1,410	5,130	1,810	7,020	790	25,680	tons
VOC	10,380	190	400	630	2,330	90	13,990	tons
CO2	0.3	0.1	0.4	0.4	0.9	0.2	1.9	mill tons
BC	20	10	80	100	230	20	430	tons
OC	340	30	60	80	170	30	680	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	410	1,210	40	-	1,650
PM10 (tons)	450	1,600	40	-	2,090
SO2 (tons)	-	50	-	-	50
NOx (tons)	590	20,890	380	-	21,840
CO (tons)	7,360	16,160	2,170	-	25,680
VOC (tons)	7,030	6,880	90	-	13,990
CO2 (mil tons)	0.2	1.6	0.2	-	1.9
BC (tons)	10	420	10	-	430
OC (tons)	240	420	30	-	680

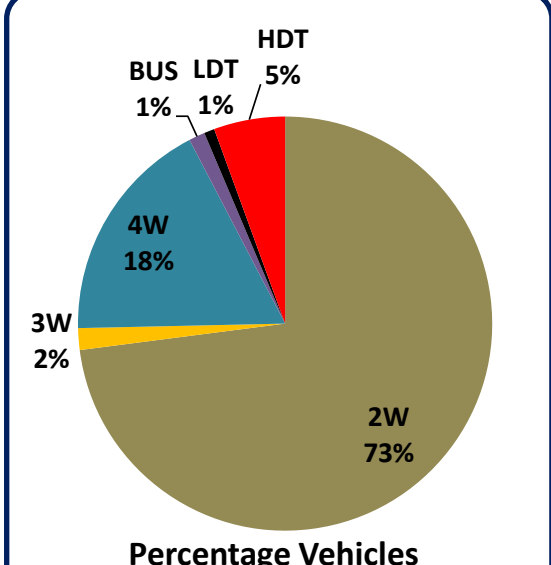
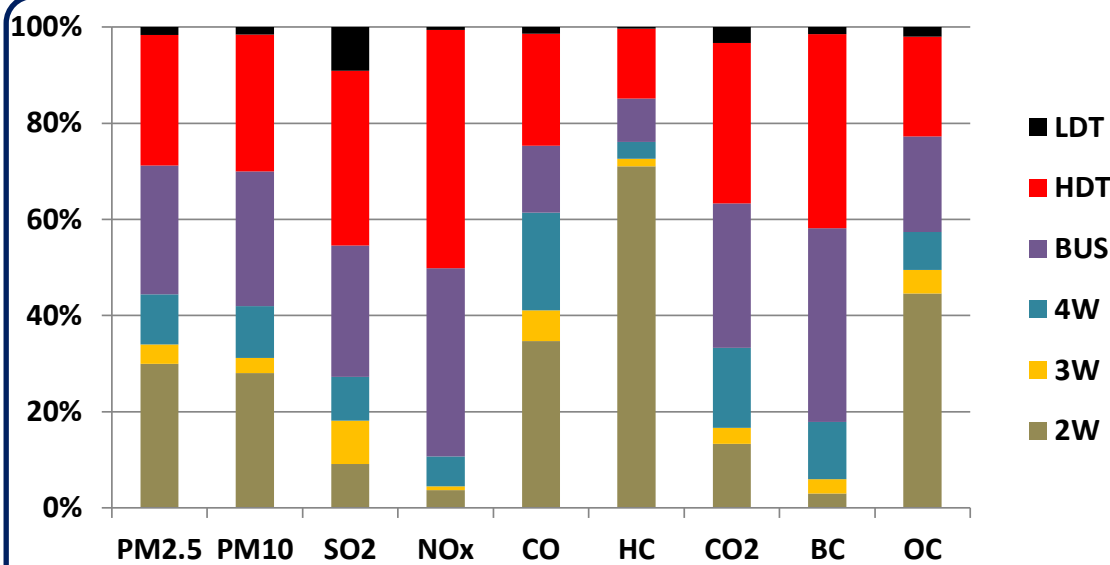


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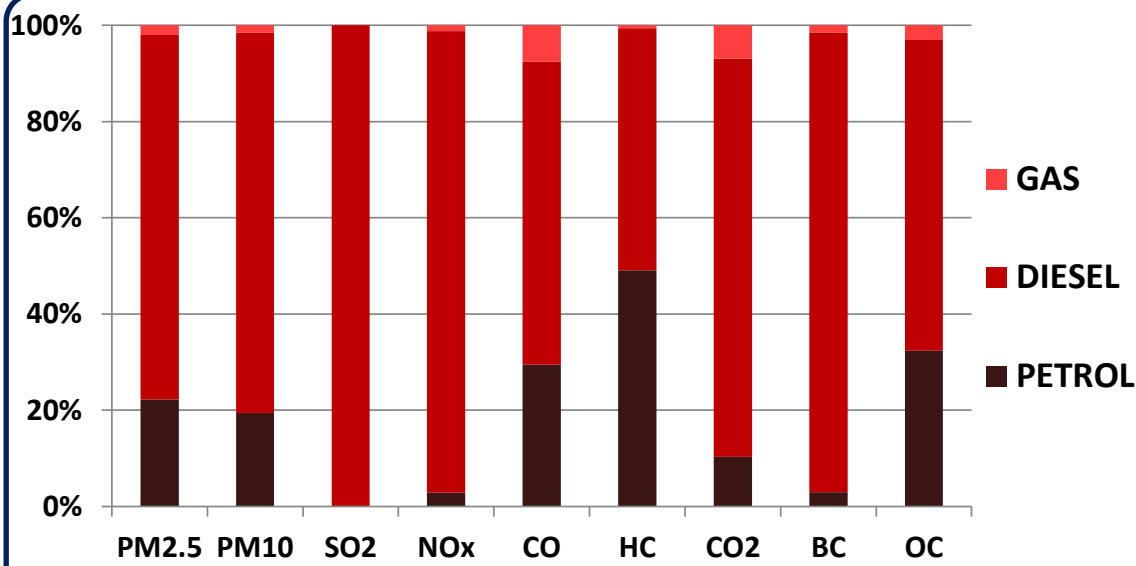
2010

CITY: JAIPUR

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	750	100	260	670	680	40	2,460	tons
PM10	890	100	340	890	900	50	3,150	tons
SO2	10	10	10	30	40	10	80	tons
NOx	1,280	280	2,160	13,550	17,210	190	34,660	tons
CO	12,680	2,340	7,410	5,080	8,510	510	36,510	tons
VOC	13,810	310	680	1,750	2,830	60	19,420	tons
CO2	0.4	0.1	0.5	0.9	1.0	0.1	2.8	mill tons
BC	20	20	80	270	270	10	660	tons
OC	450	50	80	200	210	20	980	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	550	1,880	50	-	2,460
PM10 (tons)	610	2,490	50	-	3,150
SO2 (tons)	-	80	-	-	80
NOx (tons)	1,000	33,260	410	-	34,660
CO (tons)	10,770	23,010	2,740	-	36,510
VOC (tons)	9,530	9,780	110	-	19,420
CO2 (mil tons)	0.3	2.4	0.2	-	2.8
BC (tons)	20	640	10	-	660
OC (tons)	320	640	30	-	980

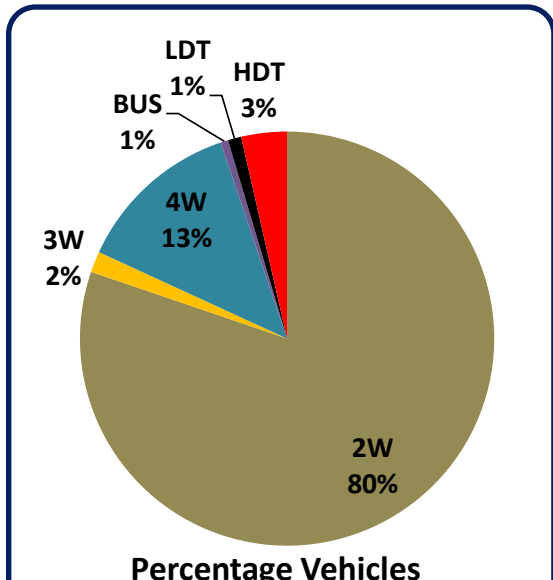
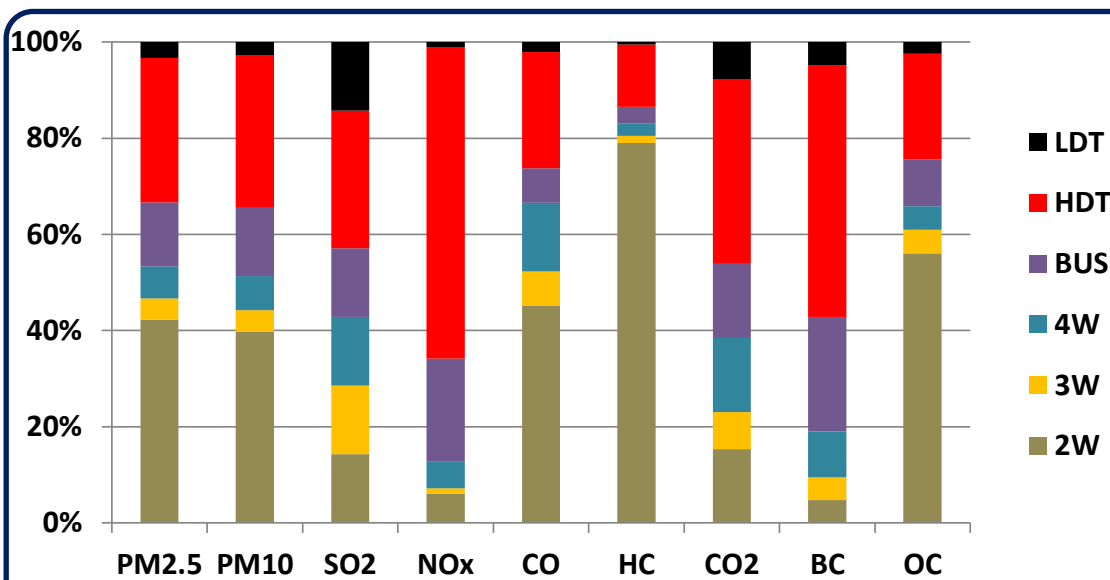


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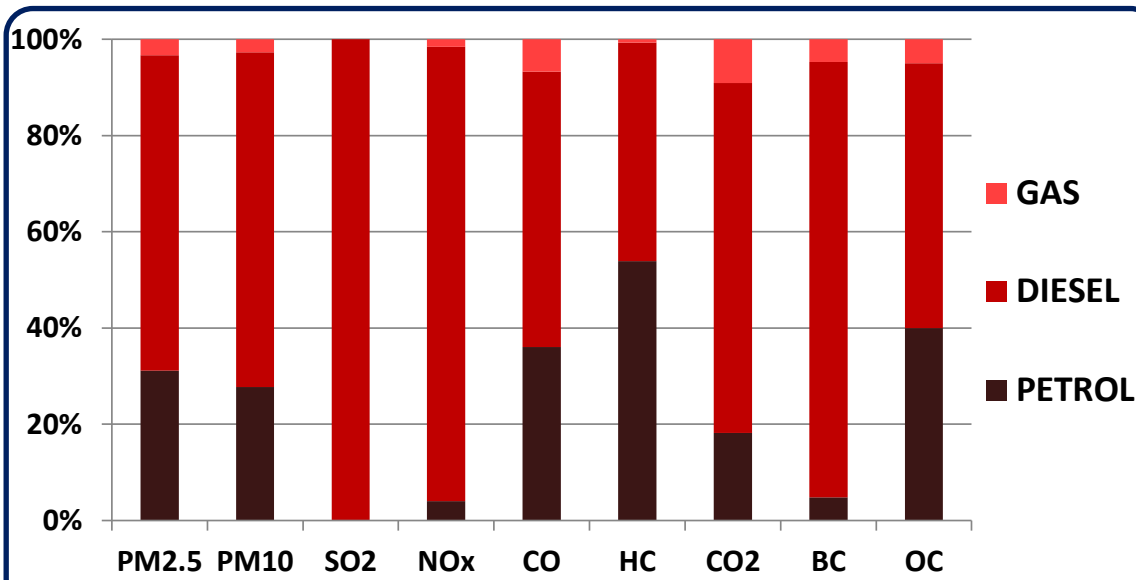
2010

CITY: KANPUR

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	380	40	60	120	270	30	880	tons
PM10	450	50	80	160	360	30	1,110	tons
SO2	10	10	10	10	20	10	30	tons
NOx	650	120	590	2,280	6,910	110	10,630	tons
CO	6,360	1,010	2,010	1,010	3,410	290	14,060	tons
VOC	6,930	130	230	300	1,140	40	8,750	tons
CO2	0.2	0.1	0.2	0.2	0.5	0.1	1.0	mill tons
BC	10	10	20	50	110	10	190	tons
OC	230	20	20	40	90	10	390	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	280	590	30	-	880
PM10 (tons)	310	780	30	-	1,110
SO2 (tons)	-	30	-	-	30
NOx (tons)	430	10,040	170	-	10,630
CO (tons)	5,070	8,050	950	-	14,060
VOC (tons)	4,720	3,980	60	-	8,750
CO2 (mil tons)	0.2	0.8	0.1	-	1.0
BC (tons)	10	190	10	-	190
OC (tons)	160	220	20	-	390

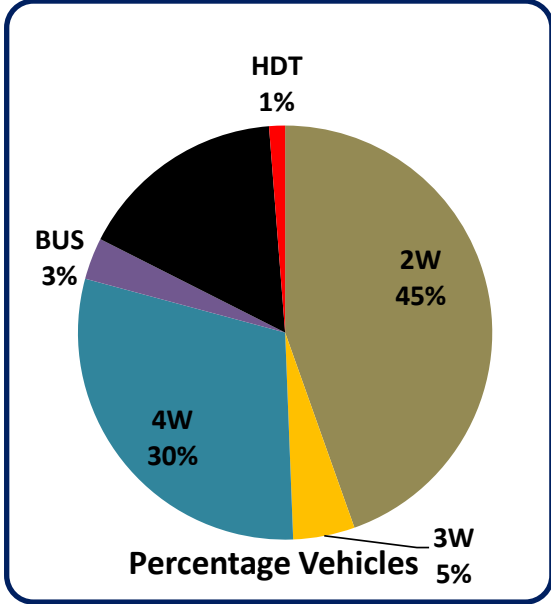
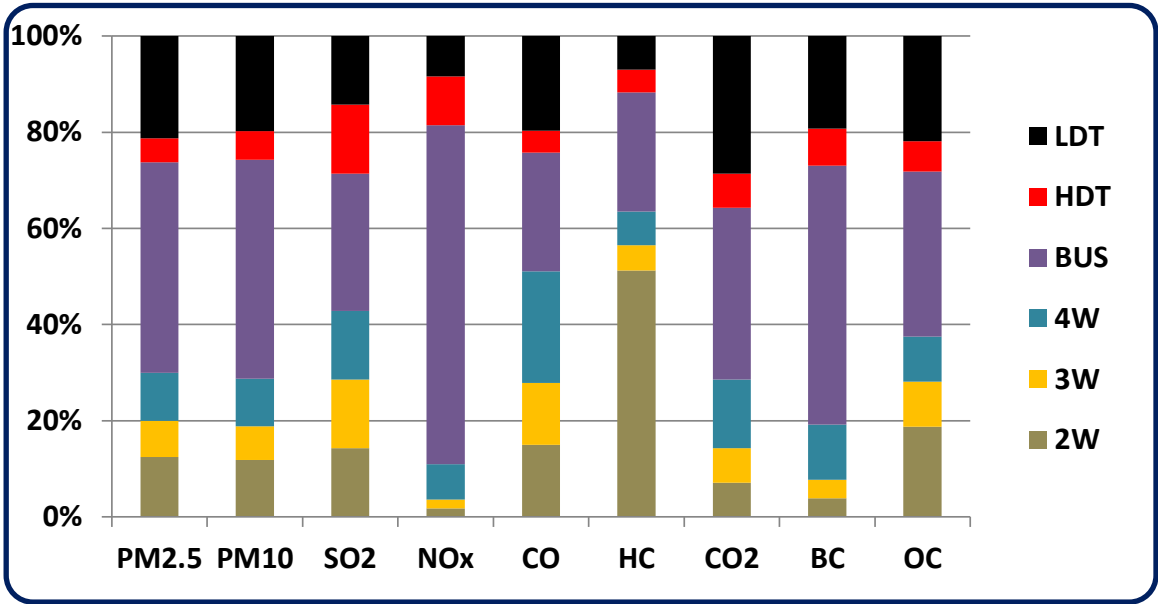


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

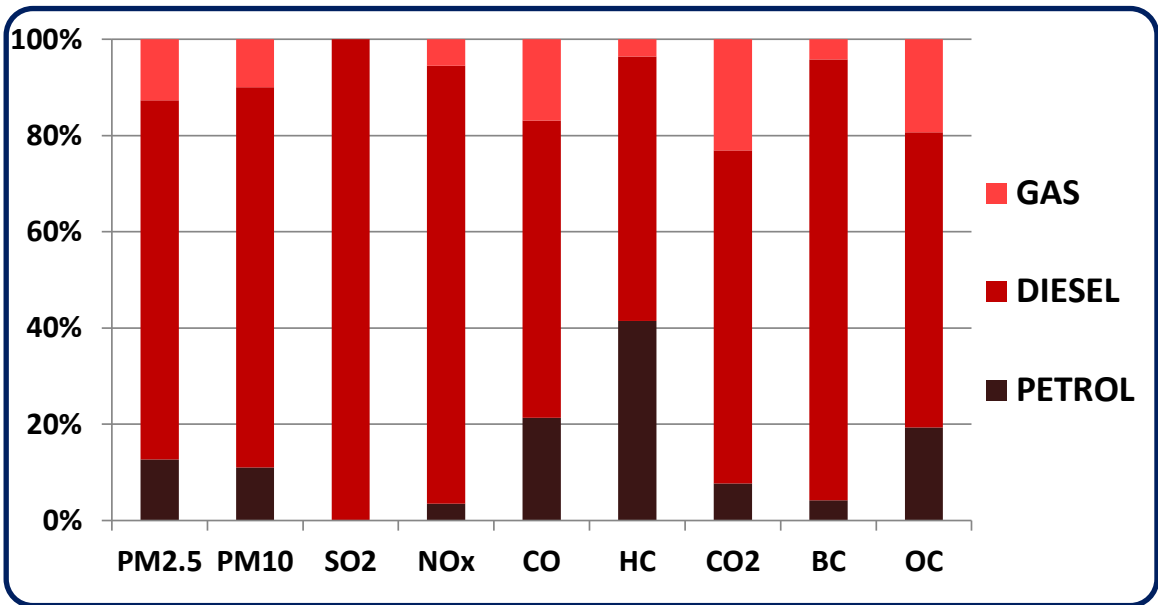
2010

CITY: KOCHI

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	100	60	80	350	40	170	780	tons
PM10	120	70	100	460	60	200	990	tons
SO2	10	10	10	20	10	10	30	tons
NOx	170	180	720	6,890	990	820	9,740	tons
CO	1,690	1,450	2,620	2,790	510	2,220	11,250	tons
VOC	1,840	190	250	890	170	250	3,570	tons
CO2	0.1	0.1	0.2	0.5	0.1	0.4	1.2	mill tons
BC	10	10	30	140	20	50	230	tons
OC	60	30	30	110	20	70	300	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	100	590	100	-	780
PM10 (tons)	110	790	100	-	990
SO2 (tons)	-	30	-	-	30
NOx (tons)	340	8,870	540	-	9,740
CO (tons)	2,400	6,960	1,900	-	11,250
VOC (tons)	1,490	1,970	130	-	3,570
CO2 (mil tons)	0.1	0.9	0.3	-	1.2
BC (tons)	10	220	10	-	230
OC (tons)	60	190	60	-	300

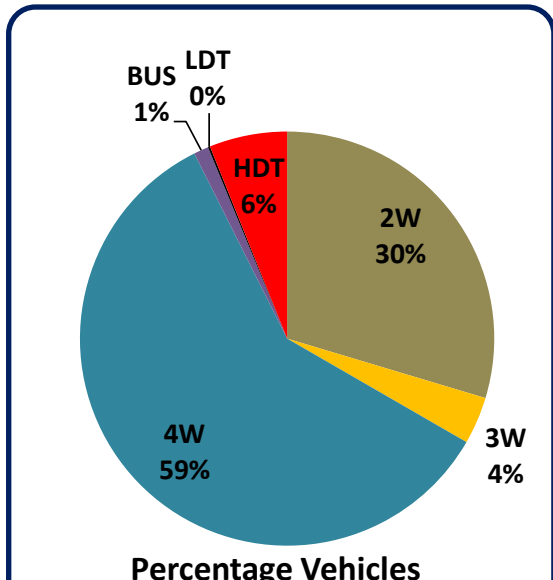
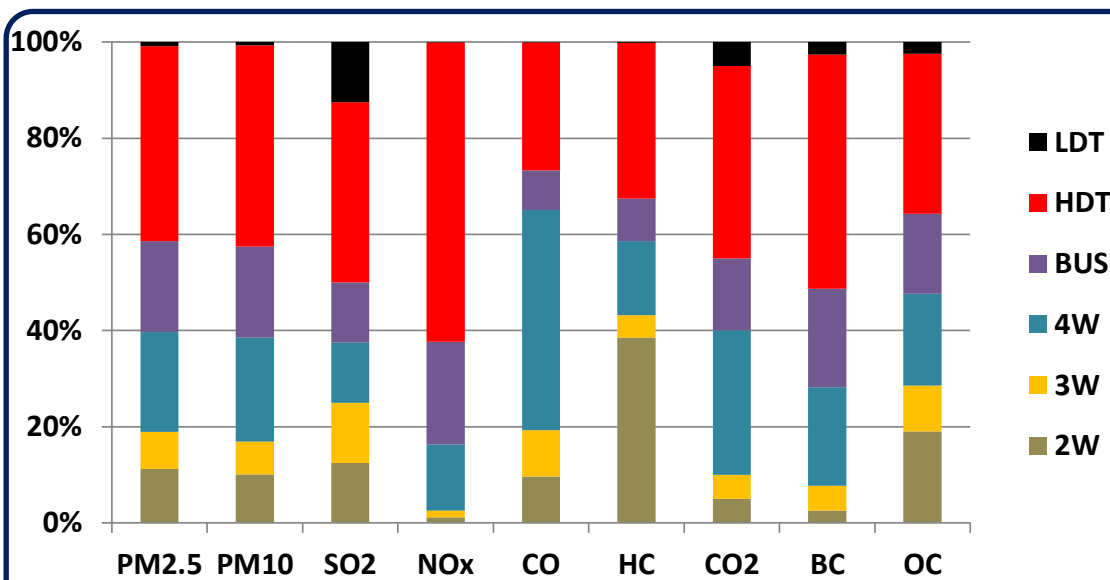


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

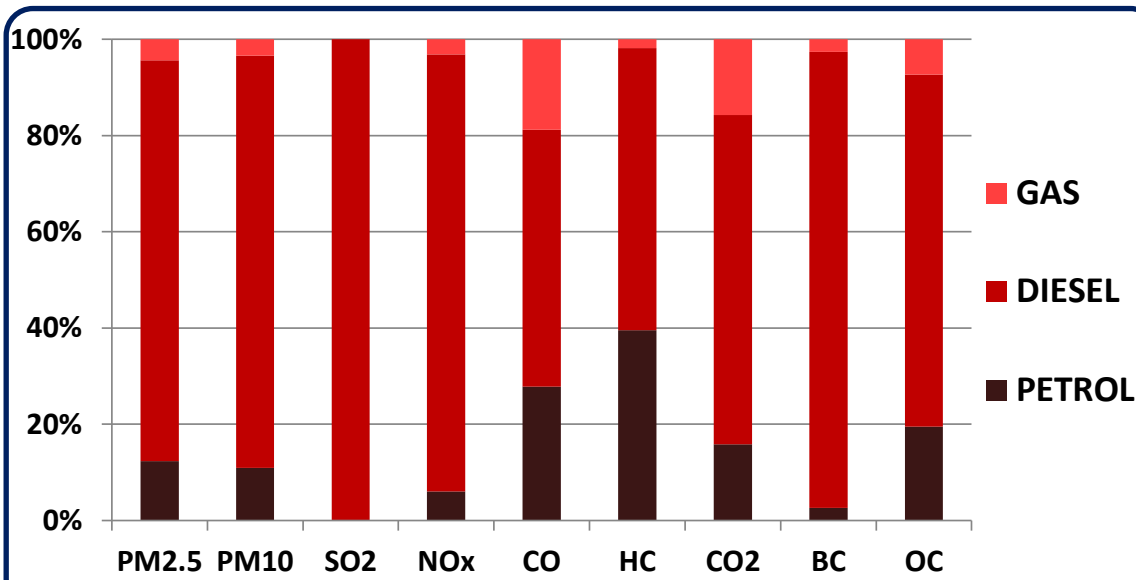
2010

CITY: KOLKATA

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	130	90	240	220	470	10	1,120	tons
PM10	150	100	320	280	620	10	1,450	tons
SO2	10	10	10	10	30	10	40	tons
NOx	220	260	2,620	4,070	11,840	10	18,990	tons
CO	2,130	2,120	10,080	1,800	5,860	20	21,990	tons
VOC	2,320	280	930	530	1,950	10	5,980	tons
CO2	0.1	0.1	0.6	0.3	0.8	0.1	1.8	mill tons
BC	10	20	80	80	190	10	360	tons
OC	80	40	80	70	140	10	400	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	140	950	50	-	1,120
PM10 (tons)	160	1,260	50	-	1,450
SO2 (tons)	-	40	-	-	40
NOx (tons)	1,140	17,260	600	-	18,990
CO (tons)	6,110	11,750	4,140	-	21,990
VOC (tons)	2,370	3,510	110	-	5,980
CO2 (mil tons)	0.3	1.3	0.3	-	1.8
BC (tons)	10	360	10	-	360
OC (tons)	80	300	30	-	400

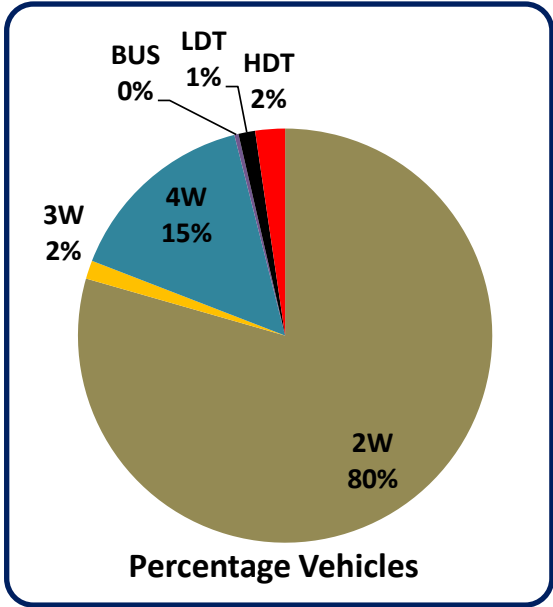
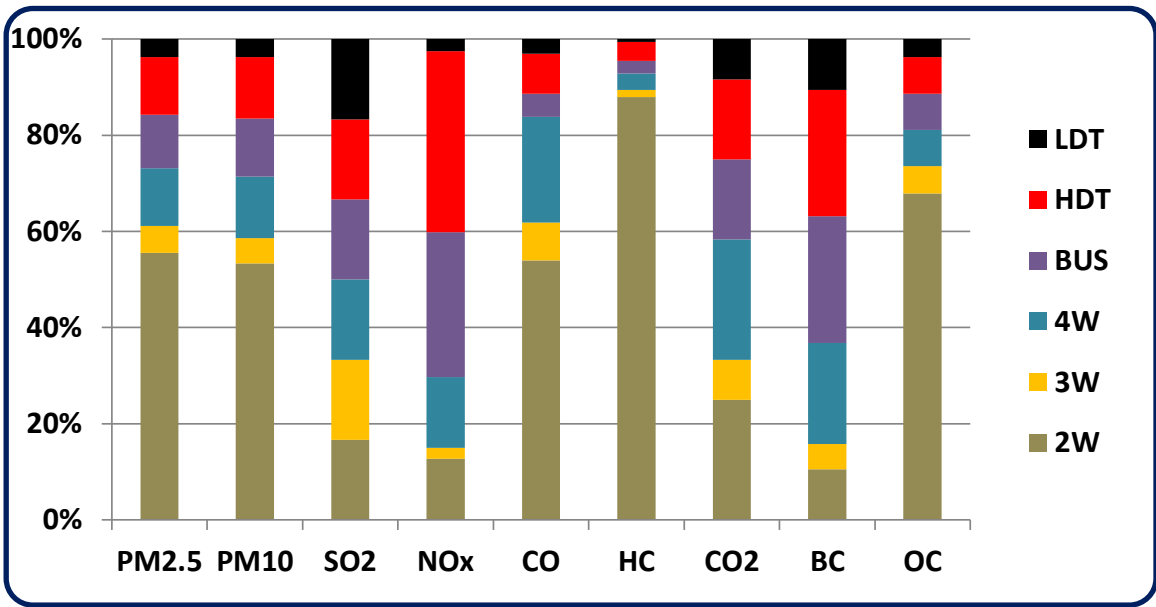


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

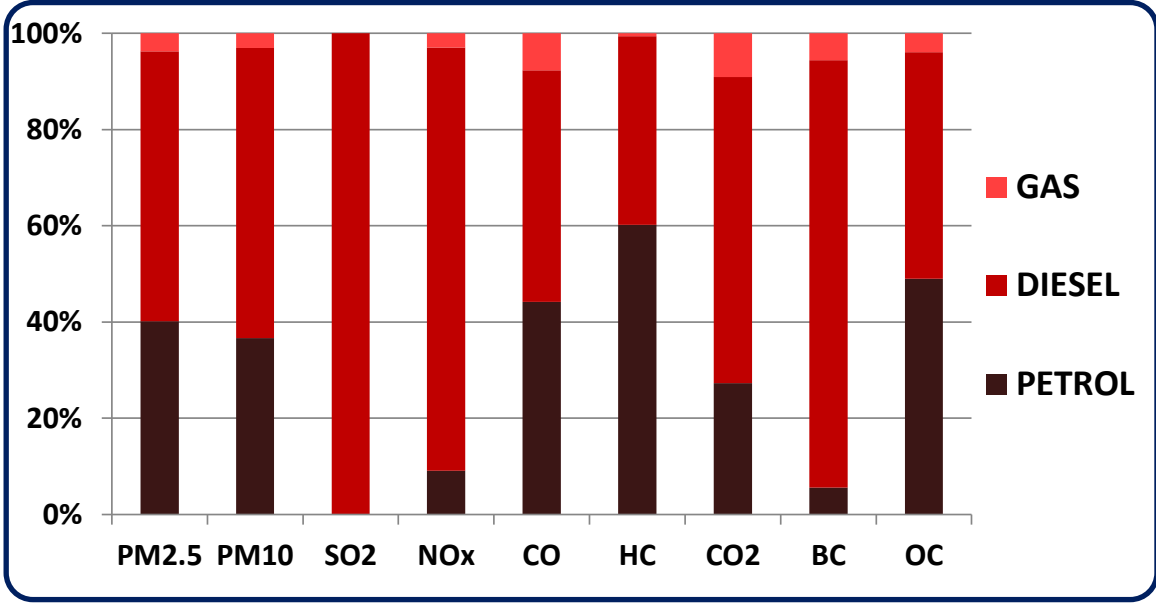
2010

CITY: LUCKNOW

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	600	60	130	120	130	40	1,060	tons
PM10	710	70	170	160	170	50	1,300	tons
SO2	10	10	10	10	10	10	30	tons
NOx	1,020	180	1,180	2,420	3,020	200	8,000	tons
CO	10,100	1,480	4,100	910	1,550	570	18,680	tons
VOC	11,000	190	430	320	500	70	12,490	tons
CO2	0.3	0.1	0.3	0.2	0.2	0.1	1.0	mill tons
BC	20	10	40	50	50	20	170	tons
OC	360	30	40	40	40	20	510	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	430	600	40	-	1,060
PM10 (tons)	480	790	40	-	1,300
SO2 (tons)	-	30	-	-	30
NOx (tons)	730	7,050	240	-	8,000
CO (tons)	8,260	9,000	1,440	-	18,680
VOC (tons)	7,520	4,900	80	-	12,490
CO2 (mil tons)	0.3	0.7	0.1	-	1.0
BC (tons)	10	160	10	-	170
OC (tons)	250	240	20	-	510

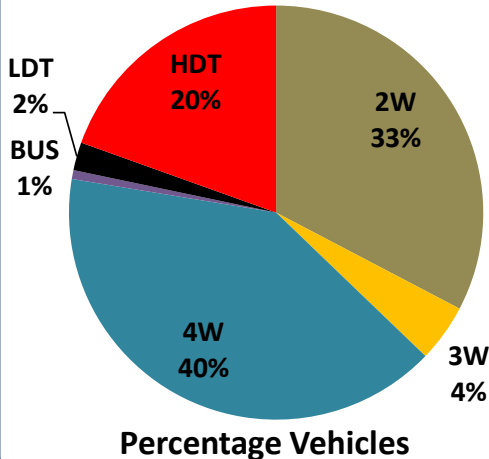
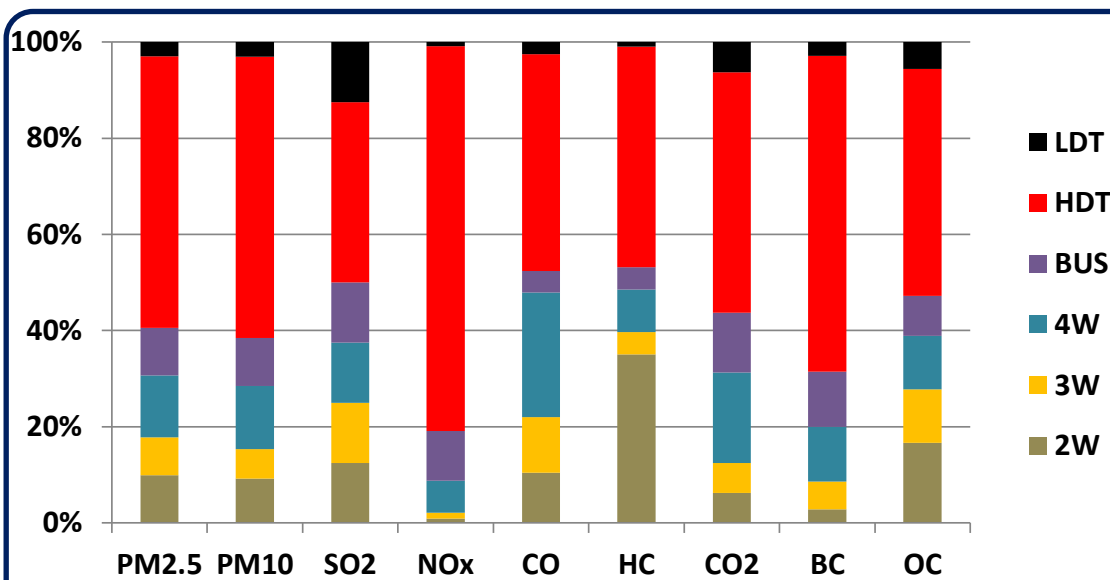


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

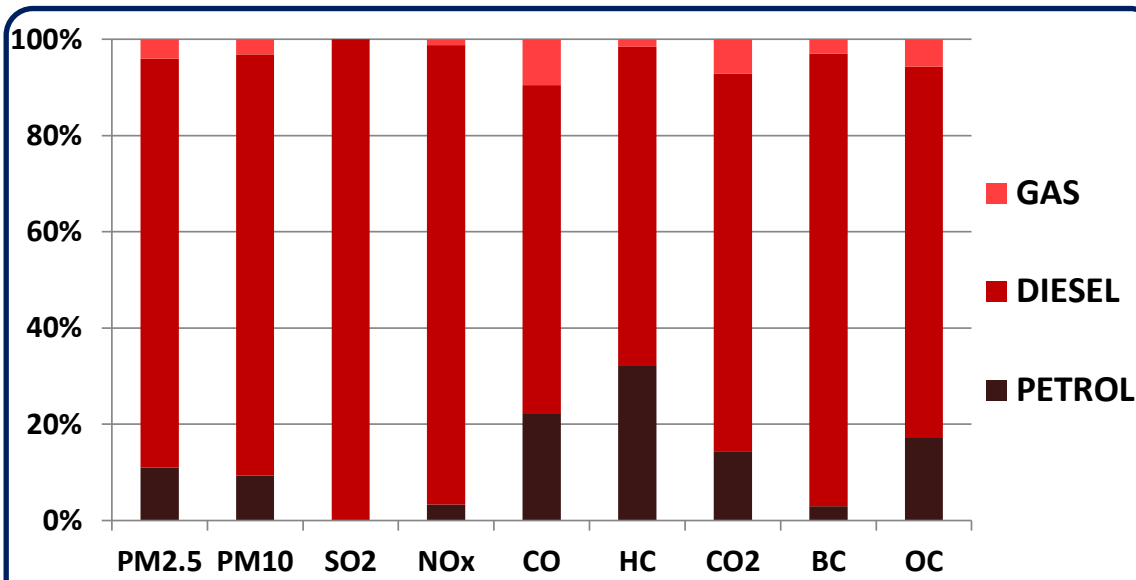
2010

CITY: LUDHIANA

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	100	80	130	100	570	30	980	tons
PM10	120	80	170	130	760	40	1,270	tons
SO2	10	10	10	10	30	10	40	tons
NOx	170	220	1,200	1,860	14,490	150	18,070	tons
CO	1,670	1,840	4,130	700	7,190	400	15,910	tons
VOC	1,820	240	460	240	2,380	50	5,180	tons
CO2	0.1	0.1	0.3	0.2	0.8	0.1	1.4	mill tons
BC	10	20	40	40	230	10	320	tons
OC	60	40	40	30	170	20	340	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	110	850	40	-	980
PM10 (tons)	120	1,120	40	-	1,270
SO2 (tons)	-	40	-	-	40
NOx (tons)	600	17,260	220	-	18,070
CO (tons)	3,550	10,860	1,520	-	15,910
VOC (tons)	1,670	3,430	80	-	5,180
CO2 (mil tons)	0.2	1.1	0.1	-	1.4
BC (tons)	10	320	10	-	320
OC (tons)	60	270	20	-	340

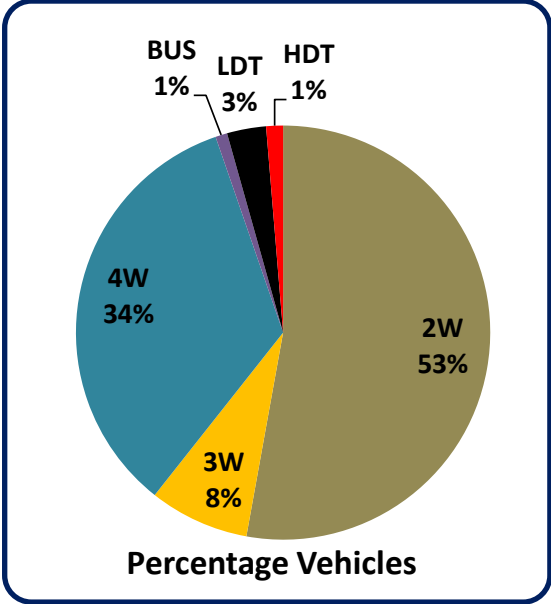
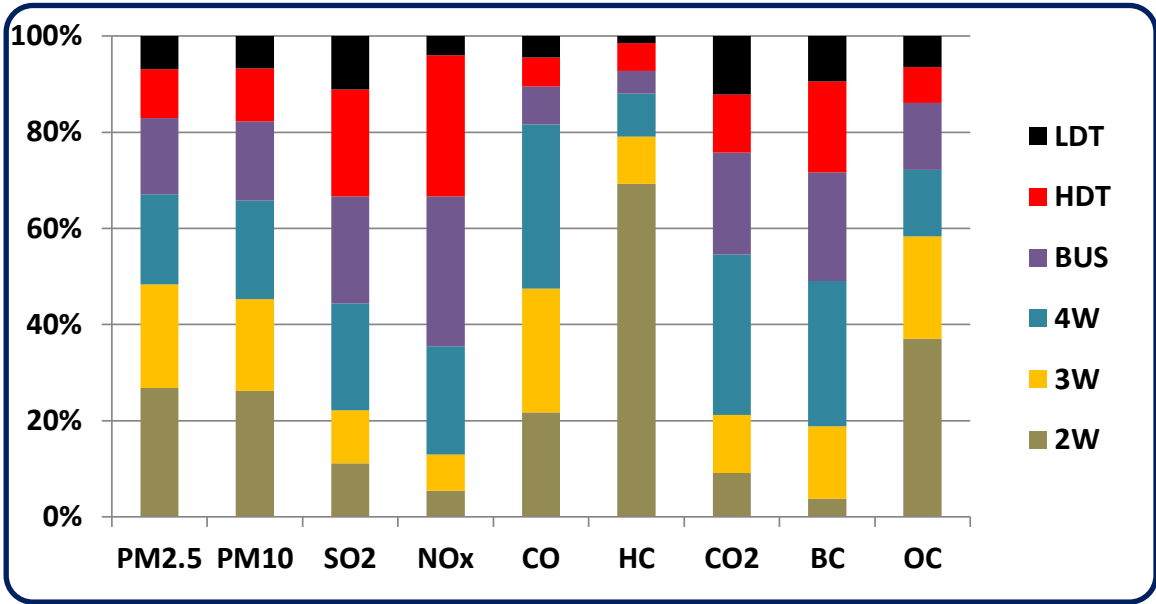


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

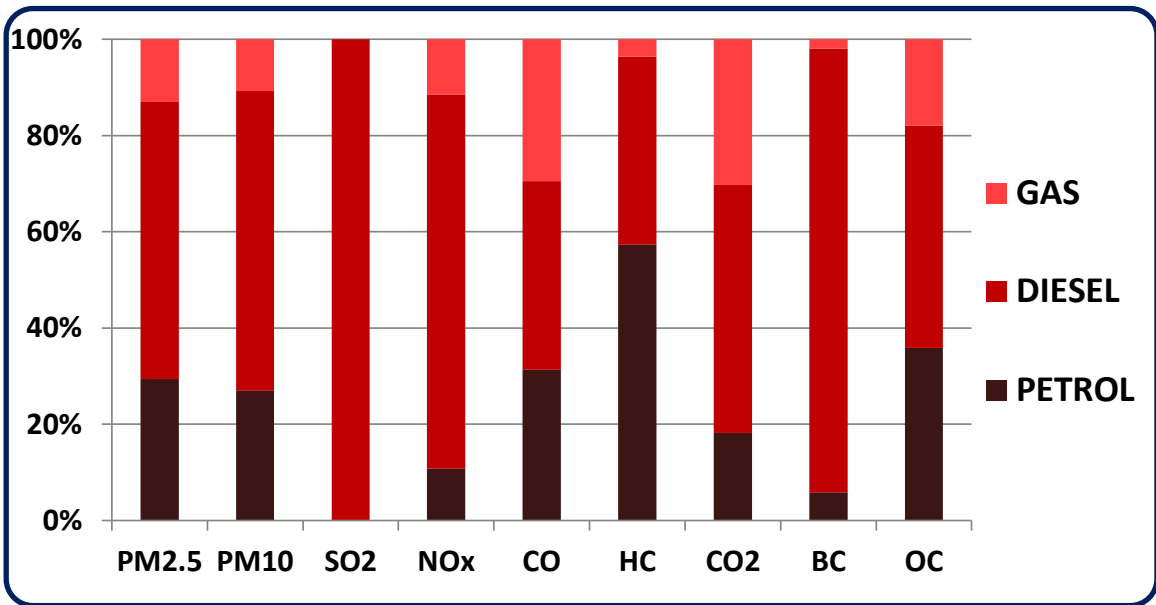
2010

CITY: MUMBAI

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	660	530	460	390	250	170	2,430	tons
PM10	780	570	610	490	330	200	2,960	tons
SO2	10	10	20	20	20	10	60	tons
NOx	1,130	1,570	4,670	6,490	6,100	830	20,760	tons
CO	11,140	13,230	17,530	4,040	3,100	2,290	51,310	tons
VOC	12,130	1,710	1,560	830	1,010	260	17,470	tons
CO2	0.3	0.4	1.1	0.7	0.4	0.4	3.1	mill tons
BC	20	80	160	120	100	50	500	tons
OC	400	230	150	150	80	70	1,050	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	720	1,410	320	-	2,430
PM10 (tons)	800	1,850	320	-	2,960
SO2 (tons)	-	60	-	-	60
NOx (tons)	2,230	16,160	2,380	-	20,760
CO (tons)	16,080	20,120	15,120	-	51,310
VOC (tons)	10,020	6,830	630	-	17,470
CO2 (mil tons)	0.6	1.7	1.0	-	3.1
BC (tons)	30	470	10	-	500
OC (tons)	380	490	190	-	1,050

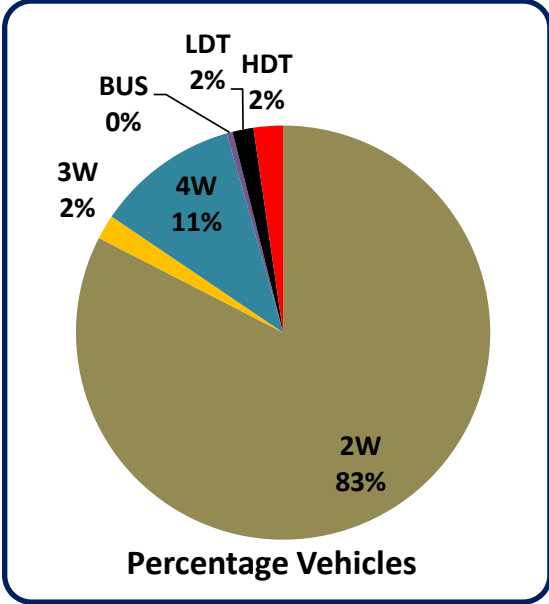
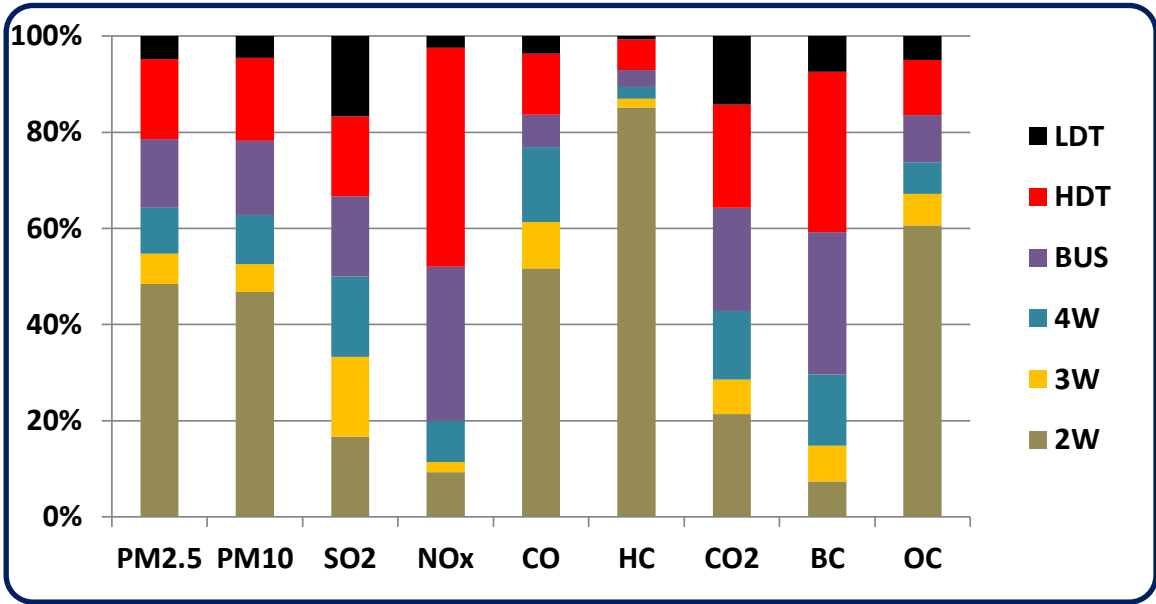


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

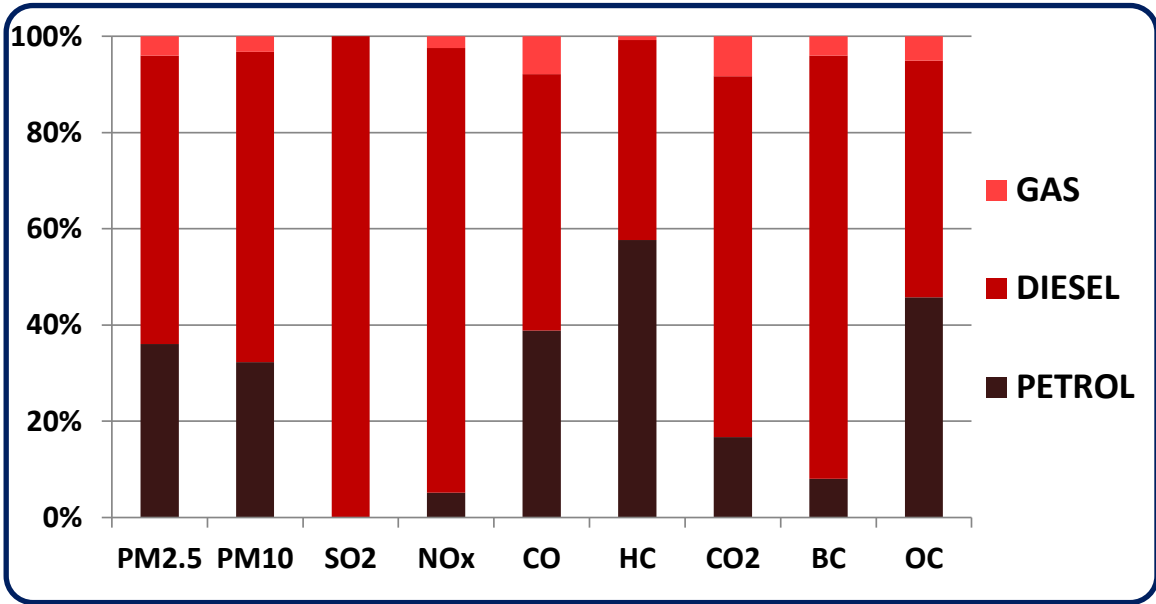
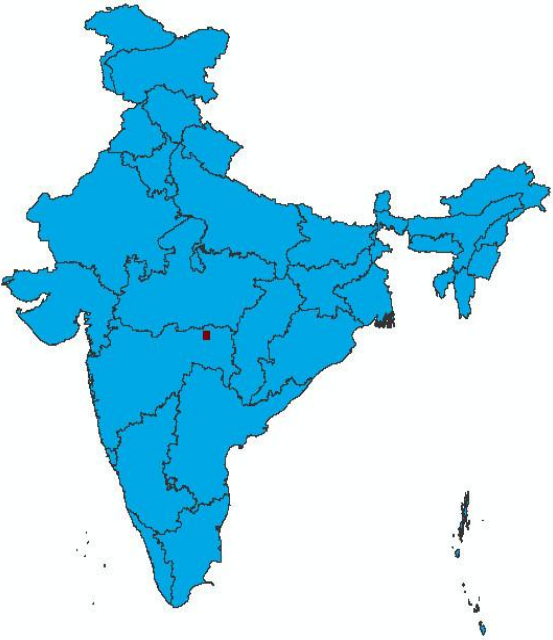
2010

CITY: NAGPUR

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	610	80	120	180	210	60	1,240	tons
PM10	730	90	160	240	270	70	1,540	tons
SO2	10	10	10	10	10	10	30	tons
NOx	1,050	230	970	3,600	5,130	270	11,230	tons
CO	10,410	1,940	3,150	1,350	2,560	740	20,120	tons
VOC	11,340	250	320	470	850	90	13,290	tons
CO2	0.3	0.1	0.2	0.3	0.3	0.2	1.2	mill tons
BC	20	20	40	80	90	20	230	tons
OC	370	40	40	60	70	30	580	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	450	750	50	-	1,240
PM10 (tons)	500	1,000	50	-	1,540
SO2 (tons)	-	30	-	-	30
NOx (tons)	580	10,390	270	-	11,230
CO (tons)	7,810	10,730	1,580	-	20,120
VOC (tons)	7,670	5,530	100	-	13,290
CO2 (mil tons)	0.2	0.9	0.1	-	1.2
BC (tons)	20	220	10	-	230
OC (tons)	270	290	30	-	580

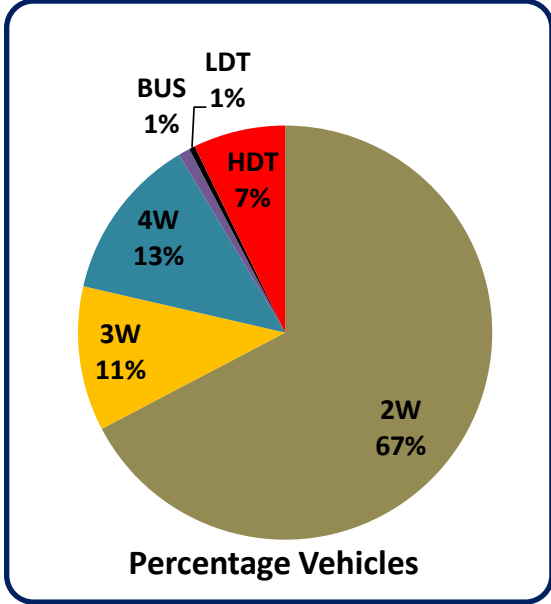
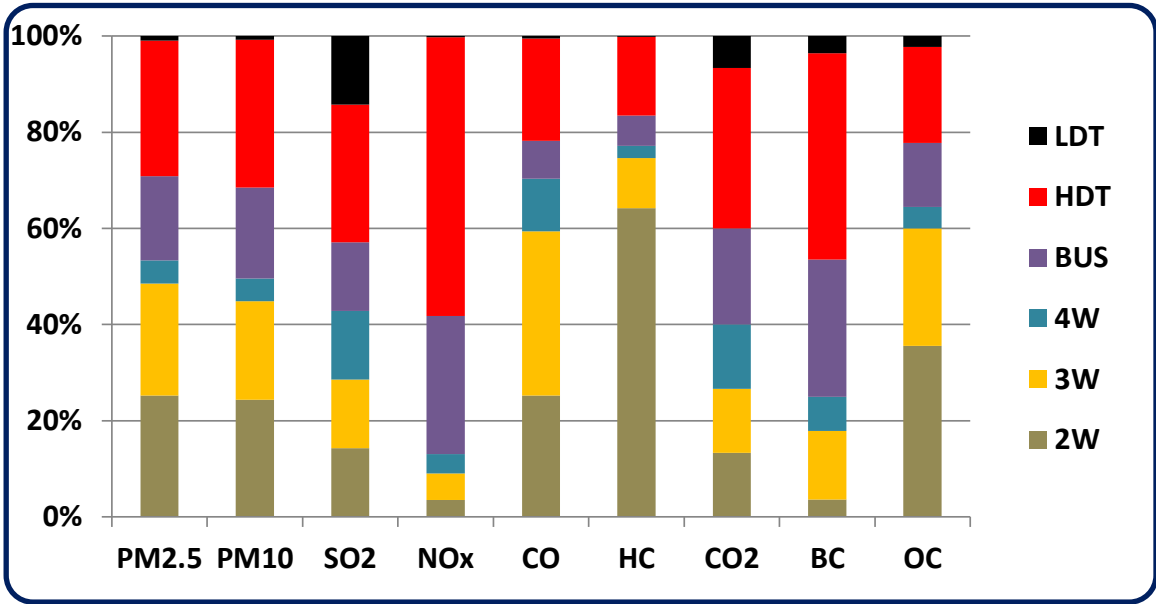


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

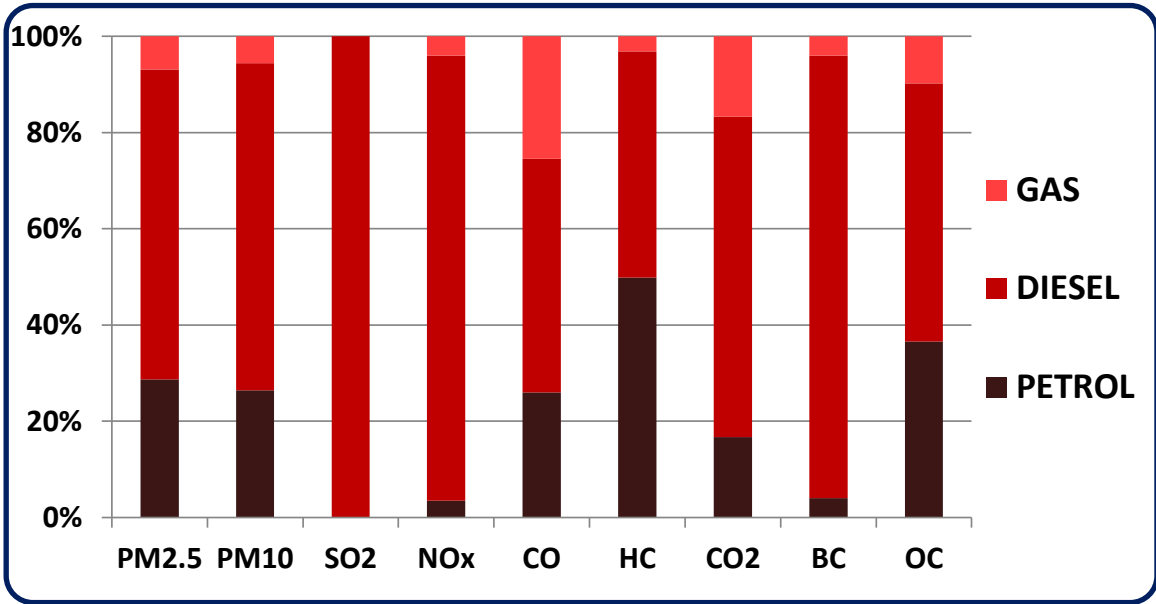
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CITY: PATNA

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	260	240	50	180	290	10	1,010	tons
PM10	310	260	60	240	390	10	1,240	tons
SO2	10	10	10	10	20	10	30	tons
NOx	440	700	500	3,610	7,290	30	12,550	tons
CO	4,360	5,900	1,890	1,360	3,680	80	17,240	tons
VOC	4,750	770	190	470	1,210	10	7,360	tons
CO2	0.2	0.2	0.2	0.3	0.5	0.1	1.1	mill tons
BC	10	40	20	80	120	10	240	tons
OC	160	110	20	60	90	10	410	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	290	650	70	-	1,010
PM10 (tons)	330	850	70	-	1,240
SO2 (tons)	-	30	-	-	30
NOx (tons)	440	11,620	500	-	12,550
CO (tons)	4,480	8,370	4,390	-	17,240
VOC (tons)	3,680	3,470	230	-	7,360
CO2 (mil tons)	0.2	0.8	0.2	-	1.1
BC (tons)	10	230	10	-	240
OC (tons)	150	220	40	-	410

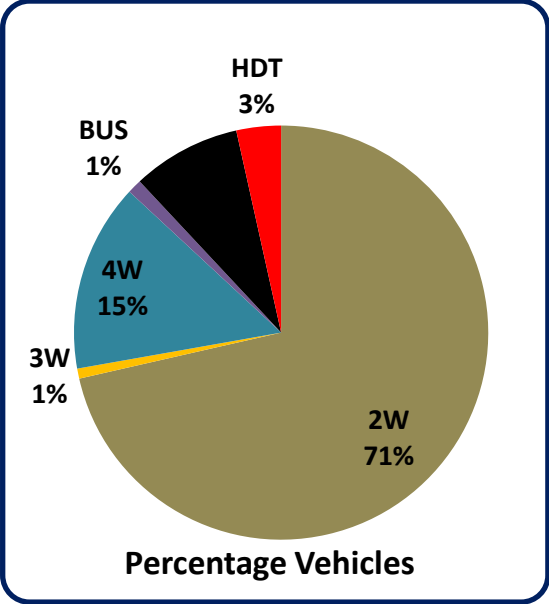
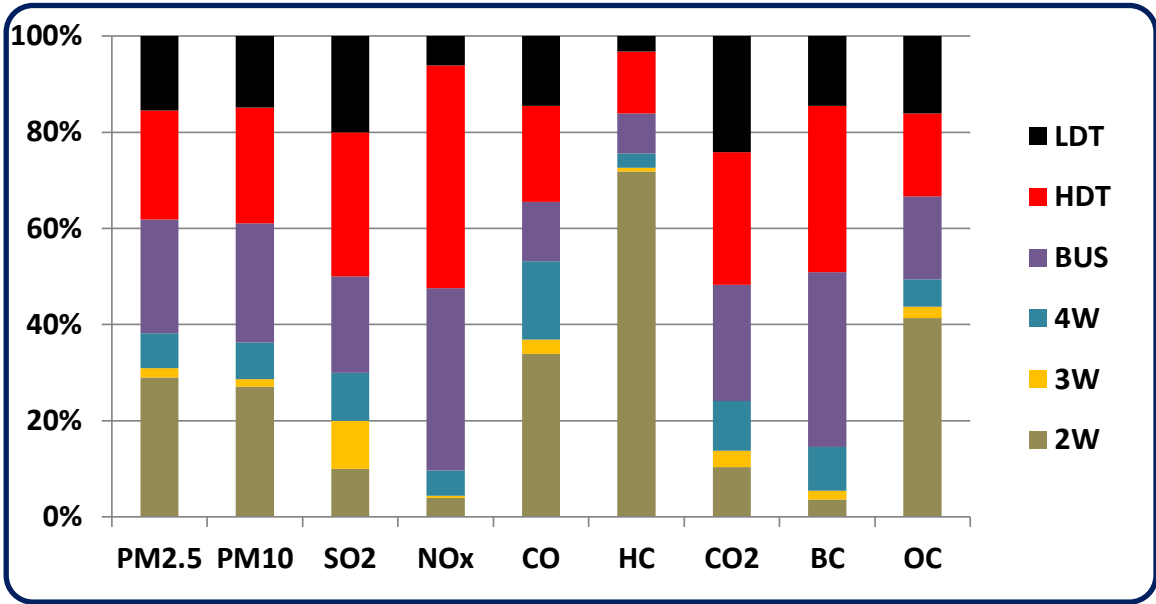


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

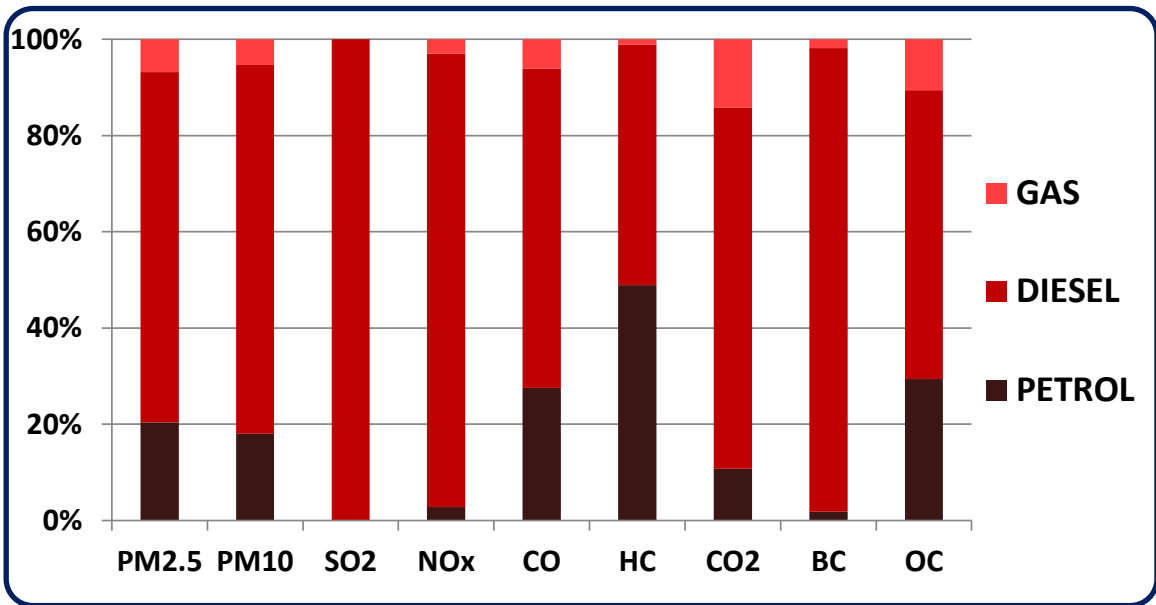
2010

CITY: PUNE

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	600	40	150	490	470	320	2,060	tons
PM10	710	40	200	650	630	390	2,600	tons
SO2	10	10	10	20	30	20	70	tons
NOx	1,030	110	1,380	9,870	12,070	1,600	26,040	tons
CO	10,170	900	4,870	3,710	5,980	4,350	29,970	tons
VOC	11,080	120	460	1,280	1,990	490	15,390	tons
CO2	0.3	0.1	0.3	0.7	0.8	0.7	2.7	mill tons
BC	20	10	50	200	190	80	530	tons
OC	360	20	50	150	150	140	840	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	420	1,500	140	-	2,060
PM10 (tons)	470	2,000	140	-	2,600
SO2 (tons)	-	70	-	-	70
NOx (tons)	730	24,550	770	-	26,040
CO (tons)	8,260	19,890	1,840	-	29,970
VOC (tons)	7,540	7,700	170	-	15,390
CO2 (mil tons)	0.3	2.1	0.4	-	2.7
BC (tons)	10	520	10	-	530
OC (tons)	250	510	90	-	840

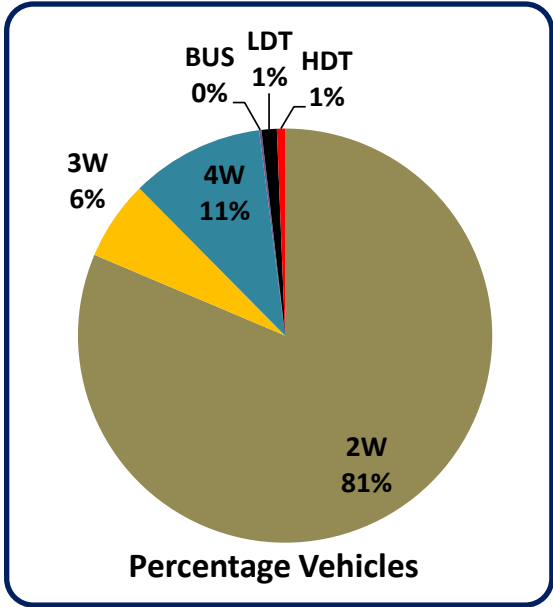
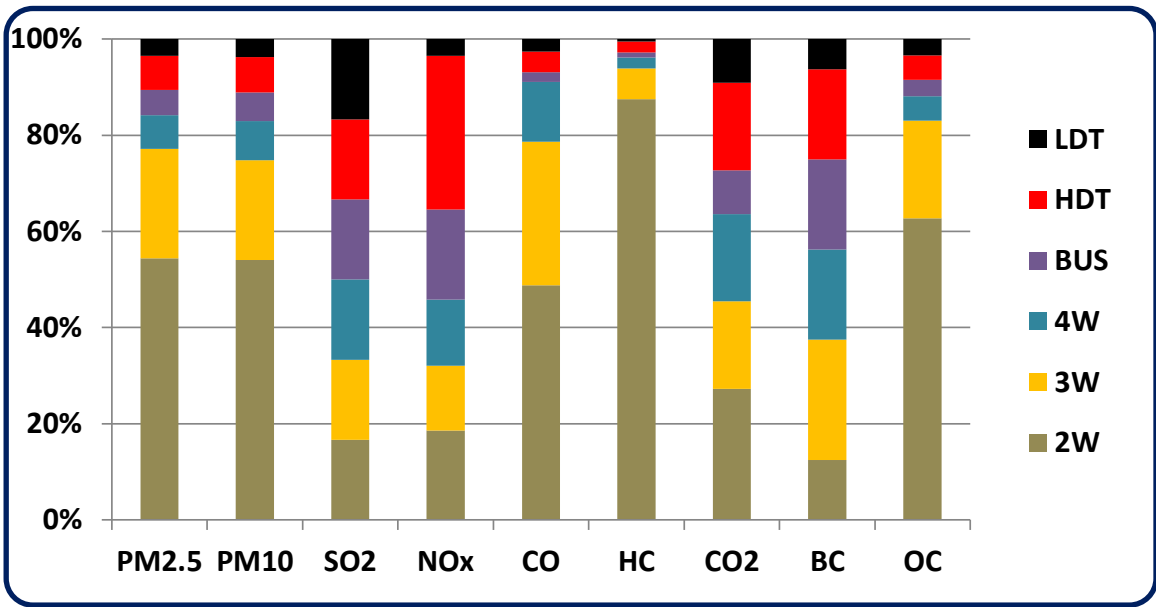


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

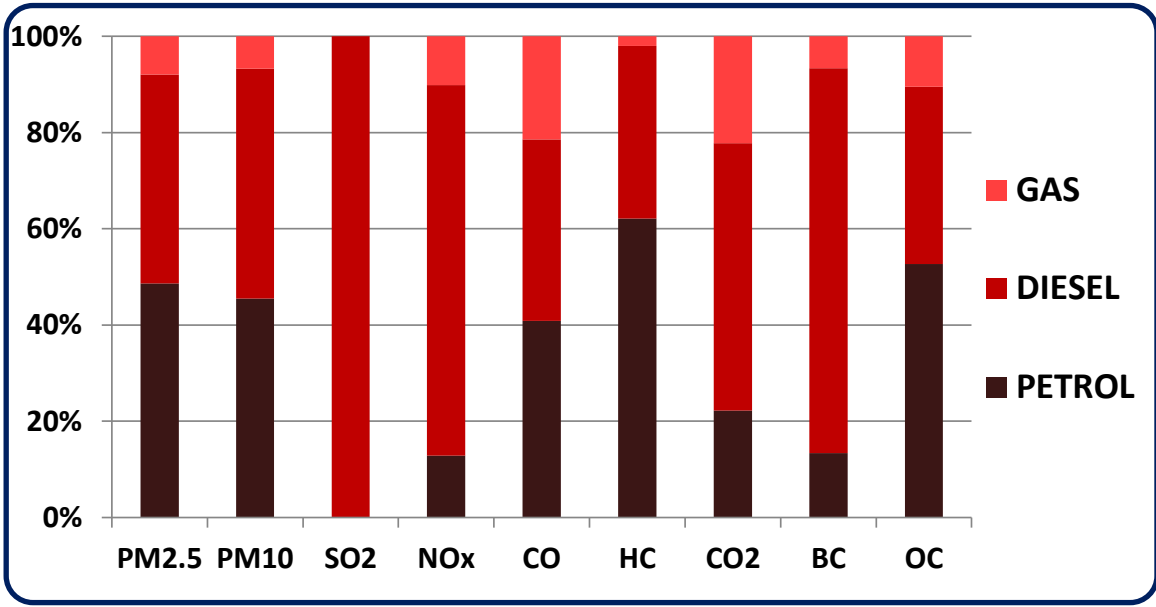
2010

CITY: SURAT

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	620	260	80	60	80	40	1,120	tons
PM10	730	280	110	80	100	50	1,330	tons
SO2	10	10	10	10	10	10	20	tons
NOx	1,060	770	780	1,070	1,820	200	5,680	tons
CO	10,510	6,430	2,680	440	930	550	21,510	tons
VOC	11,450	830	300	140	300	60	13,080	tons
CO2	0.3	0.2	0.2	0.1	0.2	0.1	0.9	mill tons
BC	20	40	30	30	30	10	130	tons
OC	370	120	30	20	30	20	560	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	550	490	90	-	1,120
PM10 (tons)	610	640	90	-	1,330
SO2 (tons)	-	20	-	-	20
NOx (tons)	730	4,390	580	-	5,680
CO (tons)	8,800	8,120	4,610	-	21,510
VOC (tons)	8,130	4,700	260	-	13,080
CO2 (mil tons)	0.2	0.5	0.2	-	0.9
BC (tons)	20	120	10	-	130
OC (tons)	300	210	60	-	560

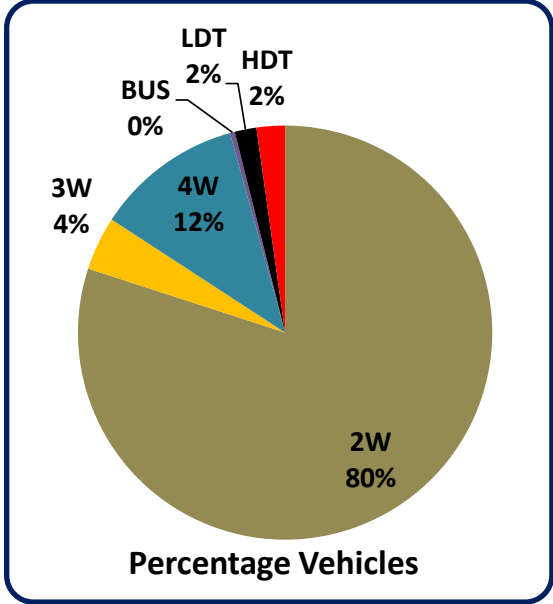
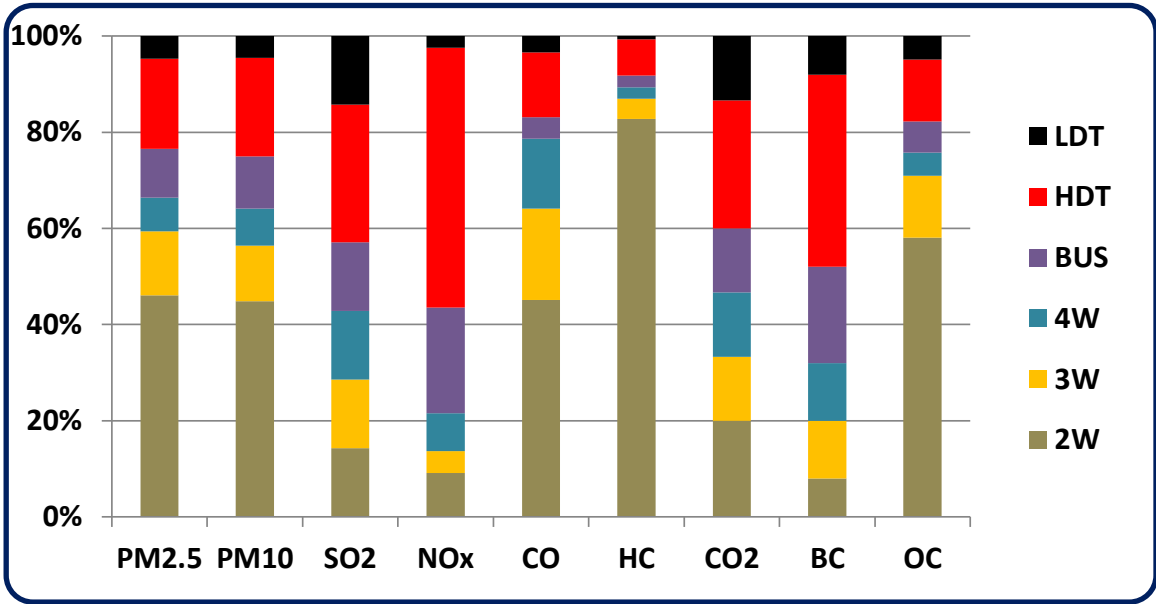


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

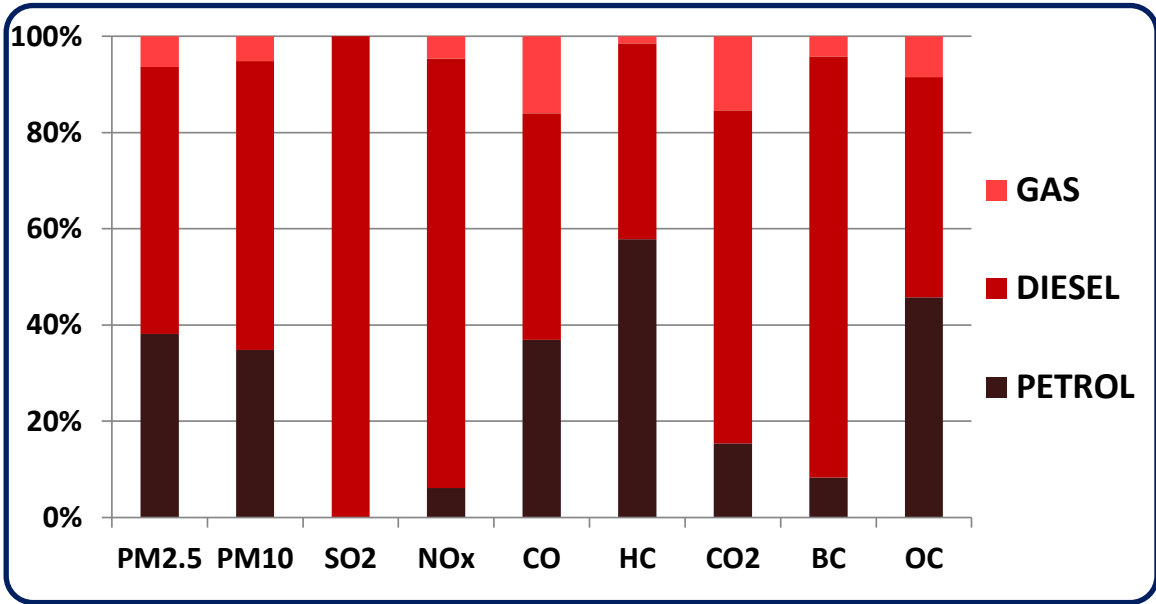
2010

CITY: VADODARA

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	590	170	90	130	240	60	1,250	tons
PM10	700	180	120	170	320	70	1,530	tons
SO2	10	10	10	10	20	10	30	tons
NOx	1,010	500	880	2,430	5,970	270	11,040	tons
CO	10,000	4,200	3,220	990	2,990	750	22,130	tons
VOC	10,900	550	320	320	990	90	13,130	tons
CO2	0.3	0.2	0.2	0.2	0.4	0.2	1.2	mill tons
BC	20	30	30	50	100	20	220	tons
OC	360	80	30	40	80	30	580	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	480	700	80	-	1,250
PM10 (tons)	540	930	80	-	1,530
SO2 (tons)	-	30	-	-	30
NOx (tons)	670	9,860	510	-	11,040
CO (tons)	8,160	10,420	3,550	-	22,130
VOC (tons)	7,600	5,360	190	-	13,130
CO2 (mil tons)	0.2	0.9	0.2	-	1.2
BC (tons)	20	210	10	-	220
OC (tons)	270	270	50	-	580

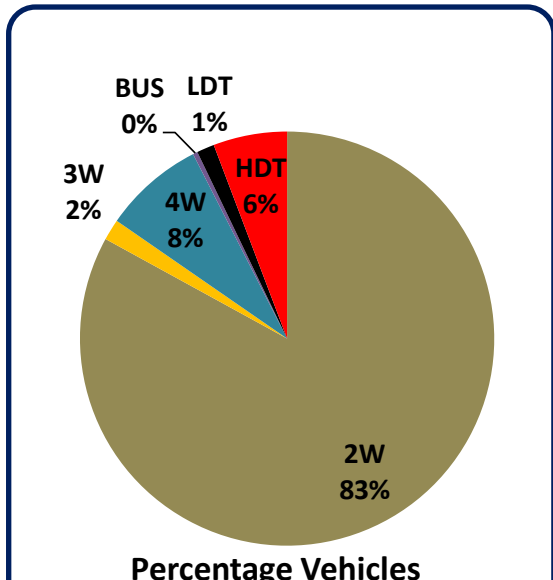
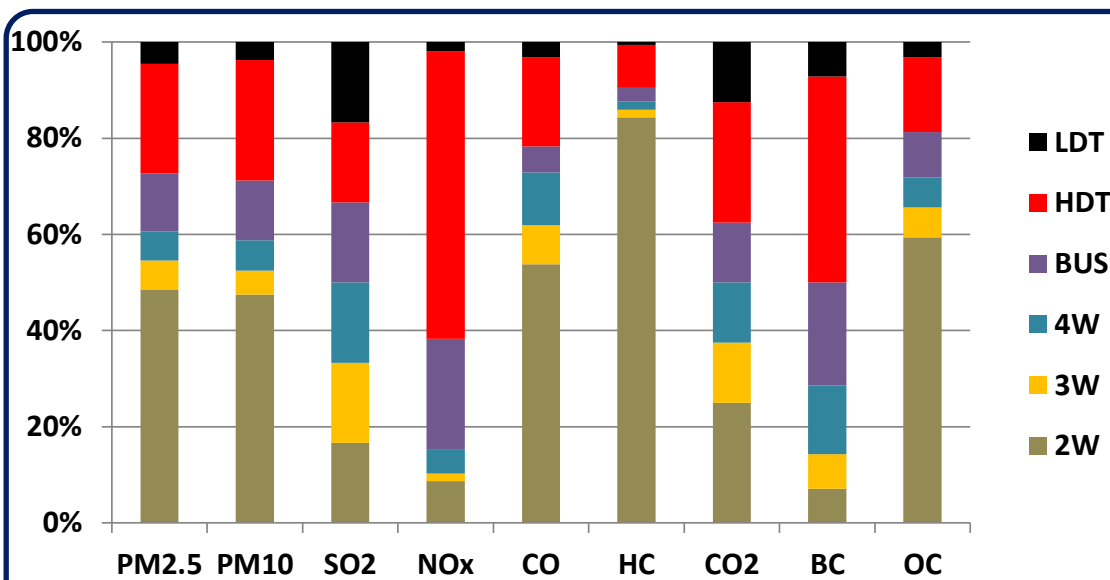


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

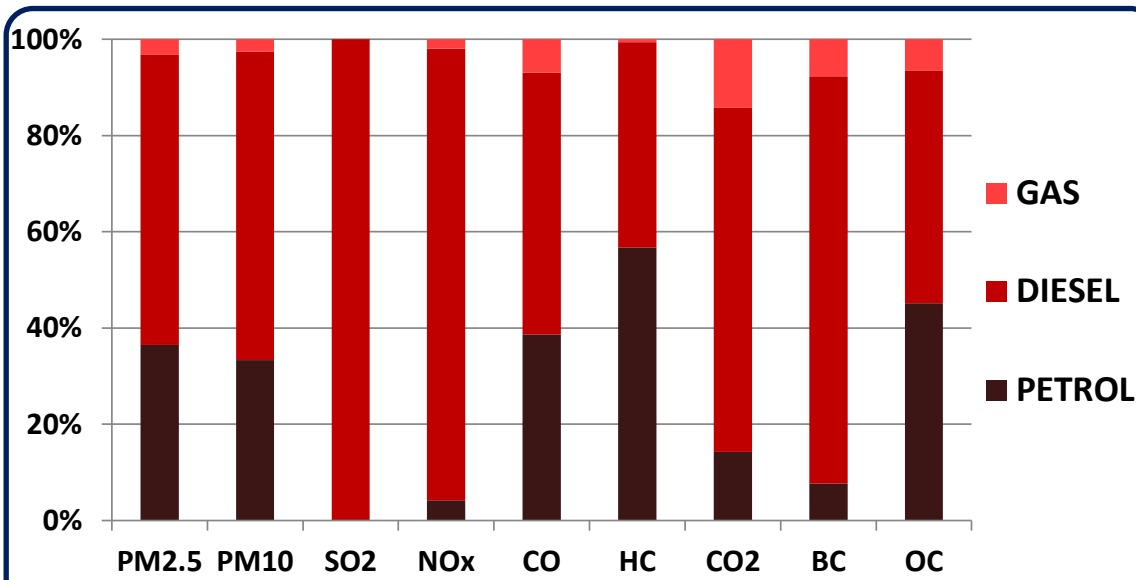
2010

CITY: VARANASI

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	320	40	40	80	150	30	620	tons
PM10	380	40	50	100	200	30	770	tons
SO2	10	10	10	10	10	10	20	tons
NOx	540	100	320	1,430	3,730	120	6,220	tons
CO	5,350	810	1,090	540	1,850	310	9,930	tons
VOC	5,830	110	120	190	620	40	6,880	tons
CO2	0.2	0.1	0.1	0.1	0.2	0.1	0.6	mill tons
BC	10	10	20	30	60	10	120	tons
OC	190	20	20	30	50	10	290	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	230	380	20	-	620
PM10 (tons)	260	500	20	-	770
SO2 (tons)	-	20	-	-	20
NOx (tons)	260	5,850	120	-	6,220
CO (tons)	3,840	5,410	690	-	9,930
VOC (tons)	3,900	2,940	40	-	6,880
CO2 (mil tons)	0.1	0.5	0.1	-	0.6
BC (tons)	10	110	10	-	120
OC (tons)	140	150	20	-	290

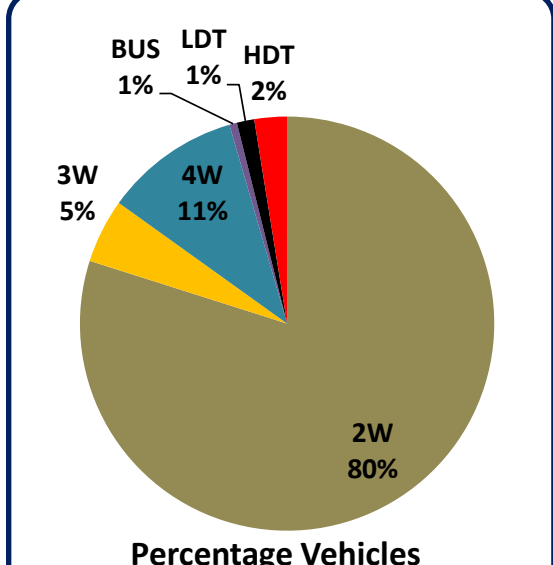
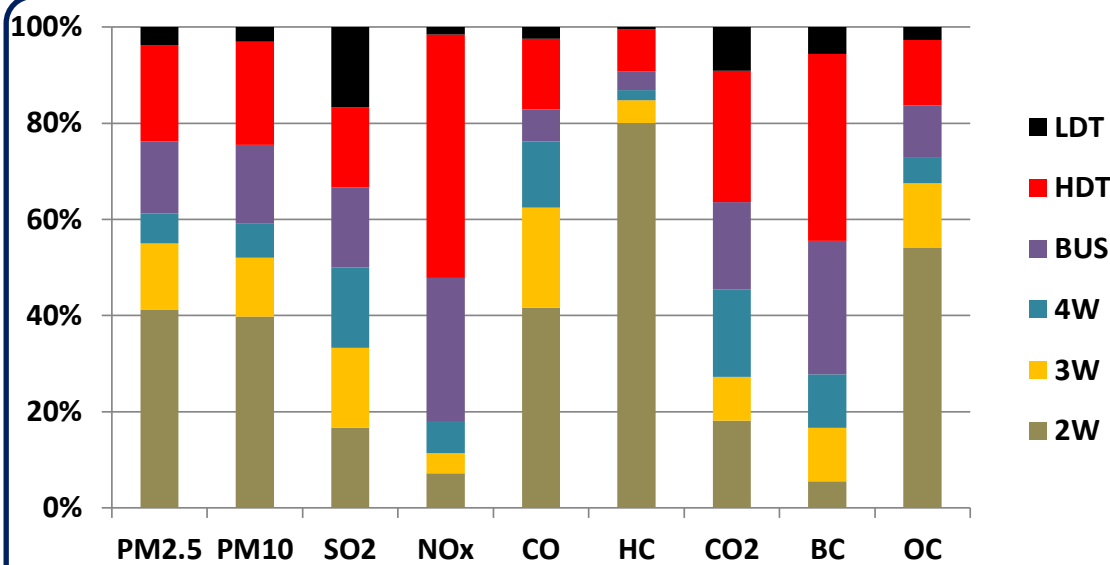


PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks

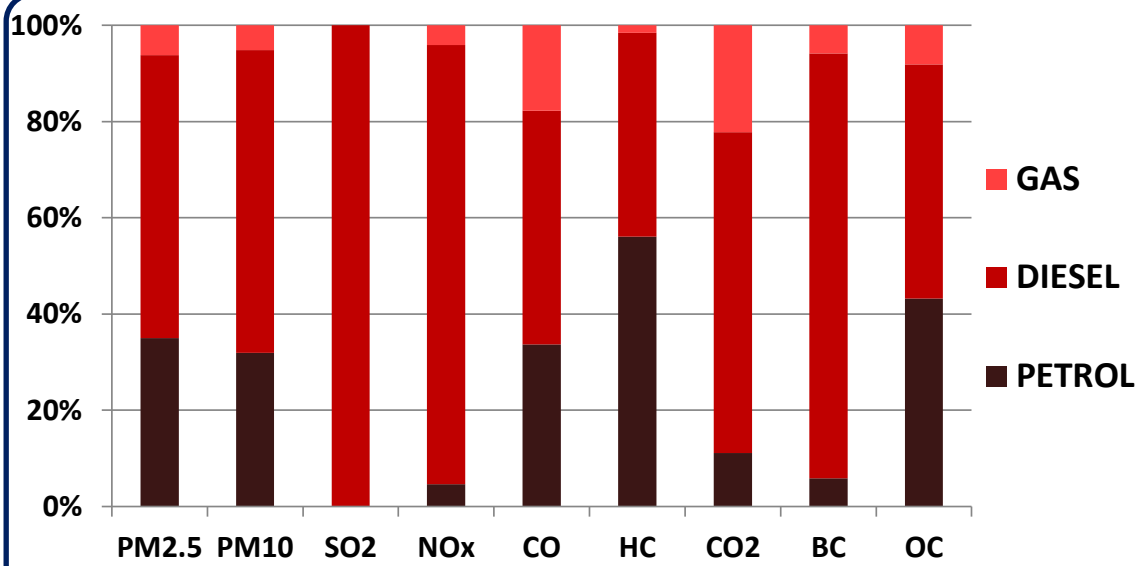
2010

CITY: VISHAKAPATNAM

per year	2W	3W	4W	BUS	HDT	LDT	TOTAL	
PM2.5	330	110	50	120	160	30	780	tons
PM10	390	120	70	160	210	30	960	tons
SO2	10	10	10	10	10	10	20	tons
NOx	560	330	500	2,330	3,940	120	7,750	tons
CO	5,560	2,780	1,840	880	1,970	320	13,320	tons
VOC	6,050	360	160	300	650	40	7,550	tons
CO2	0.2	0.1	0.2	0.2	0.3	0.1	0.8	mill tons
BC	10	20	20	50	70	10	160	tons
OC	200	50	20	40	50	10	350	tons



per year	PETROL	DIESEL	GAS	Other	TOTAL
PM2.5 (tons)	280	470	50	-	780
PM10 (tons)	310	610	50	-	960
SO2 (tons)	-	20	-	-	20
NOx (tons)	360	7,090	320	-	7,750
CO (tons)	4,490	6,470	2,370	-	13,320
VOC (tons)	4,240	3,200	120	-	7,550
CO2 (mil tons)	0.1	0.6	0.2	-	0.8
BC (tons)	10	150	10	-	160
OC (tons)	160	180	30	-	350



PM = particulate matter; PM2.5 = PM less than 2.5 μm diameter; PM10 = PM less than 10 μm ; SO2 = sulfur dioxide; NOx = nitrogen oxides; CO = carbon monoxide; HC = volatile organic compounds; CO2 = carbon dioxide; BC = black carbon; OC = organic carbon; 2W = 2-wheeler motorcycles; 3W = 3-wheeler para-transit; 4W = cars, utility vehicles, and taxis; BUS = public and private buses; LDT = light duty trucks; HDT = heavy duty trucks