



Draft Emissions Inventory – Annual PM_{2.5} SIP

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TAC Meeting

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Emissions Inventory Requirements

- Base Year 2002 Annual Inventory
 - NO_x, SO₂, PM_{2.5}, PM₁₀, VOC, NH₃

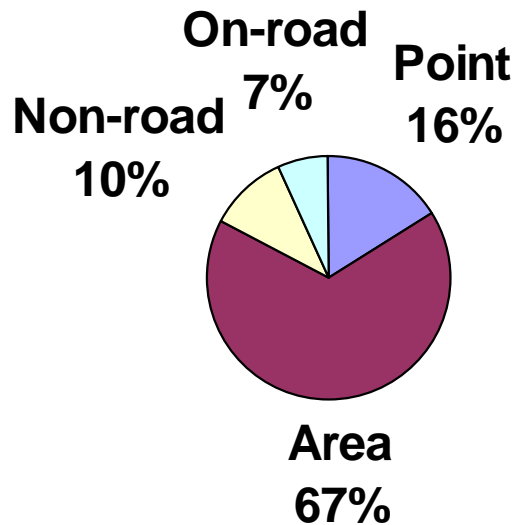
- Attainment Year 2009 Annual Inventories (Controlled & Uncontrolled)
 - NO_x, SO₂, PM_{2.5}



Draft BY 2002 Emissions Inventory

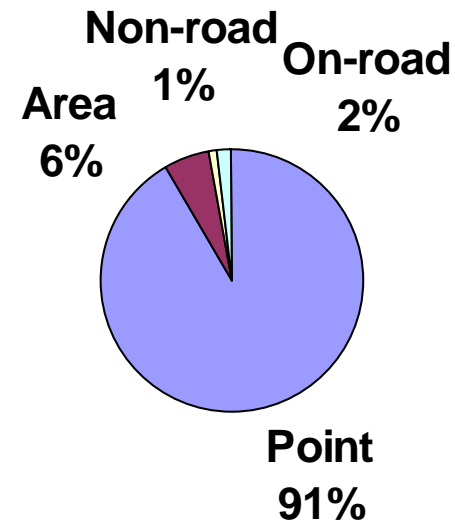
PM2.5

BY 2002 Emissions = 25,406.17 tpy



SO2

BY 2002 Emissions = 223,328.56 tpy

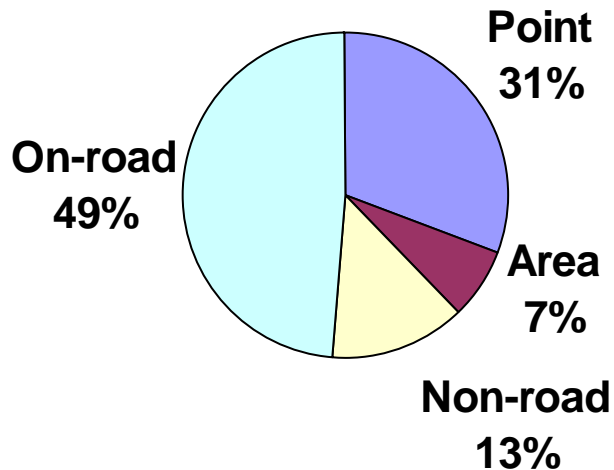




Draft BY 2002 Emissions Inventory

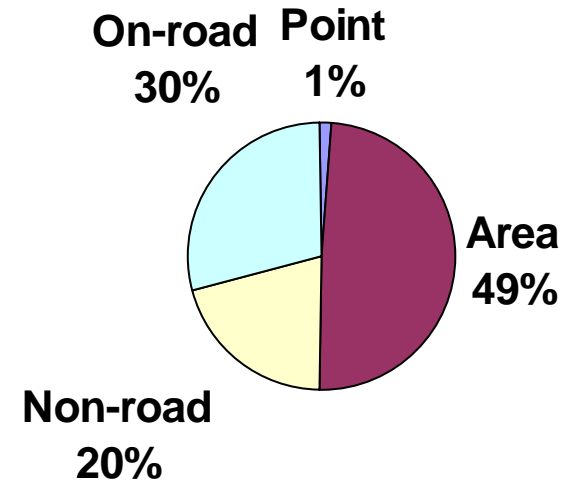
NOx

BY 2002 Emissions = 199,594.00 tpy



VOC

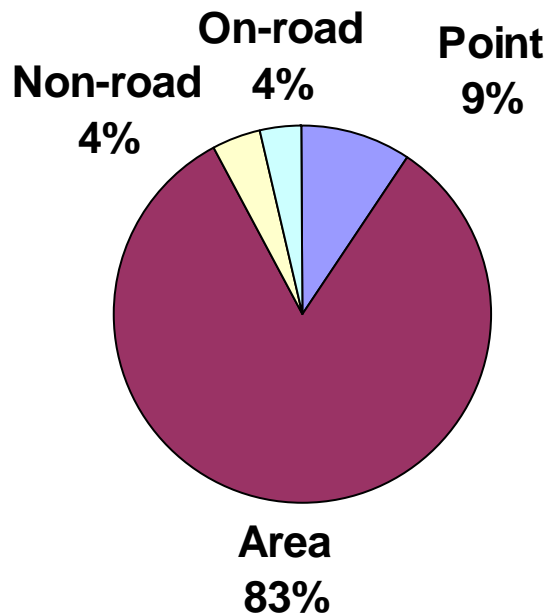
BY 2002 Emissions = 148,781.83 tpy



Draft BY 2002 Emissions Inventory

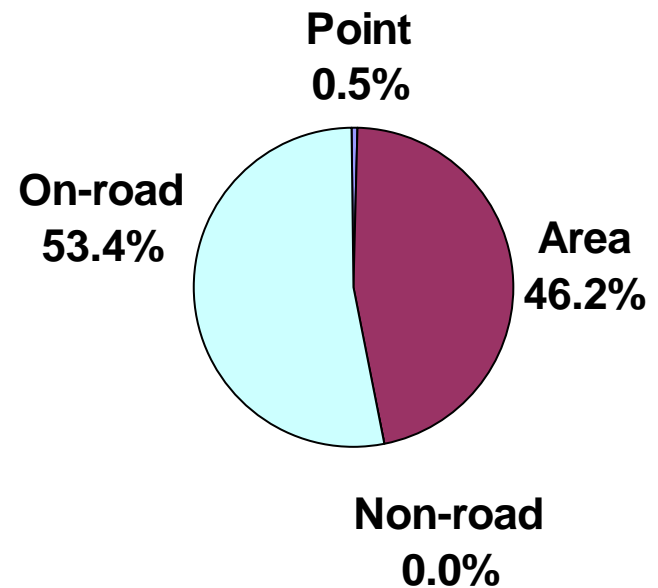
PM10

BY 2002 Emissions = 67,446.34 tpy



NH3

BY 2002 Emissions = 7,952.22 tpy





Significant Sources – BY 2002 PM2.5 & precursors Emissions

■ **PM2.5**

- Open Burning - Land Clearing Debris
- Power Plants & Other Industries
- Residential wood combustion
- Road Construction
- Nonroad Construction & Mining Equipments
- Lawn & Garden Equipments

■ **NOx**

- Motor vehicles
- Power Plants & Other Industries
- Nonroad Construction & Mining Equipments
- Lawn & Garden Equipments



Significant Sources – BY 2002 PM2.5 & precursors Emissions

■ **SO₂**

- Power Plants & Other Industries
- Coal Combustion – Industrial
- Coal Combustion – Commercial/Institutional
- Residential Distillate Oil Combustion
- Motor Vehicles

■ **VOC**

- Motor vehicles
- Commercial & Consumer Solvent Use
- Surface Coating
- Portable Fuel Containers
- Gasoline Storage
- Lawn & Garden Equipments



Significant Sources – BY 2002 PM2.5 & precursors Emissions

■ **PM10**

- Power Plants & Other Industries
- Open Burning - Land Clearing Debris
- Residential wood combustion: Woodstoves
- Road Construction
- Nonroad Construction & Mining Equipments
- Lawn & Garden Equipments

■ **NH3**

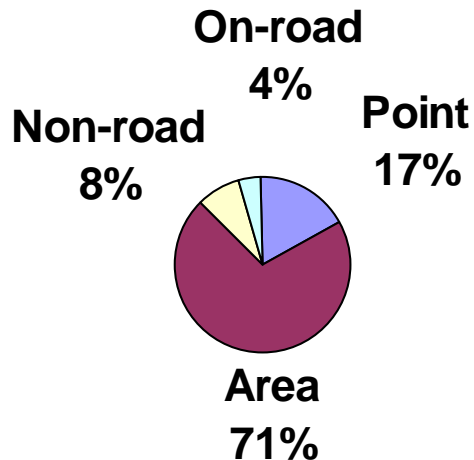
- Motor Vehicles
- Agricultural Production - Livestock



Draft AY 2009 Emissions Inventory

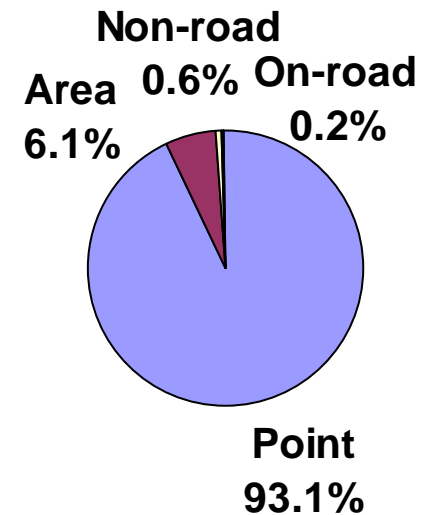
PM2.5

AY 2009 Emissions = 26,590.93 tpy



SO2

AY 2009 Emissions = 231,861.76 tpy

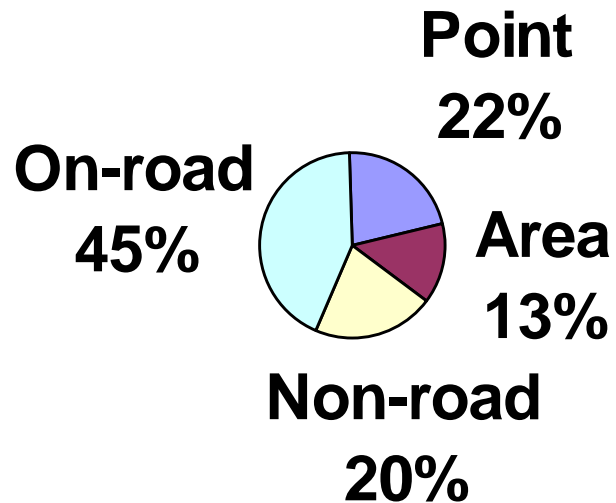




Draft AY 2009 Emissions Inventory

NO_x

AY 2009 Emissions = 117,102.98 tpy





Significant Sources – AY 2009 PM2.5 & precursors Emissions

■ **PM2.5**

- Power Plants & Other Industries
- Open Burning - Land Clearing Debris
- Residential wood combustion: Woodstoves
- Road Construction
- Nonroad Construction & Mining Equipments
- Lawn & Garden Equipments

■ **NOx**

- Motor vehicles
- Power Plants & Other Industries
- Nonroad Construction & Mining Equipments
- Lawn & Garden Equipments

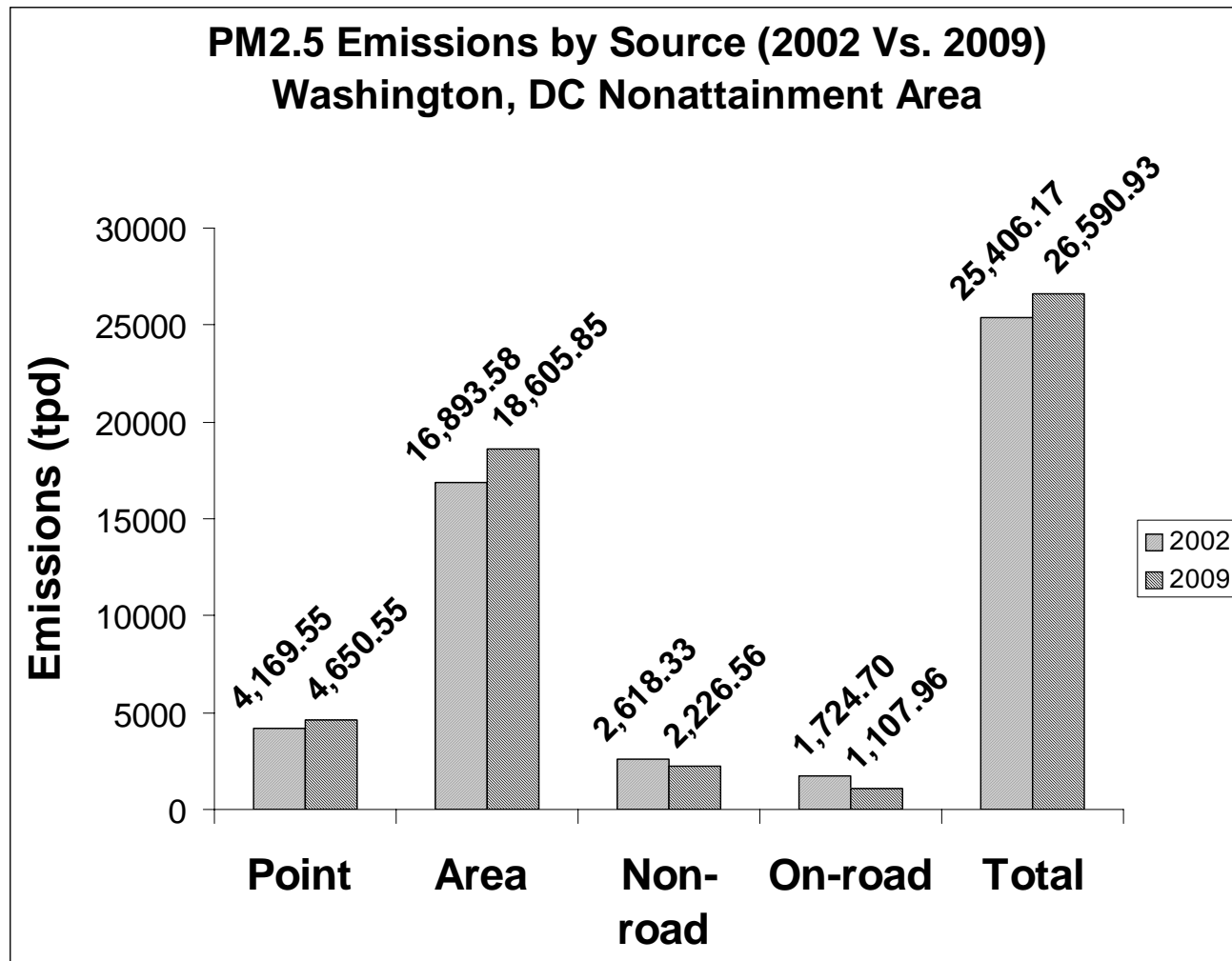


Significant Sources – AY 2009 PM2.5 & precursors Emissions

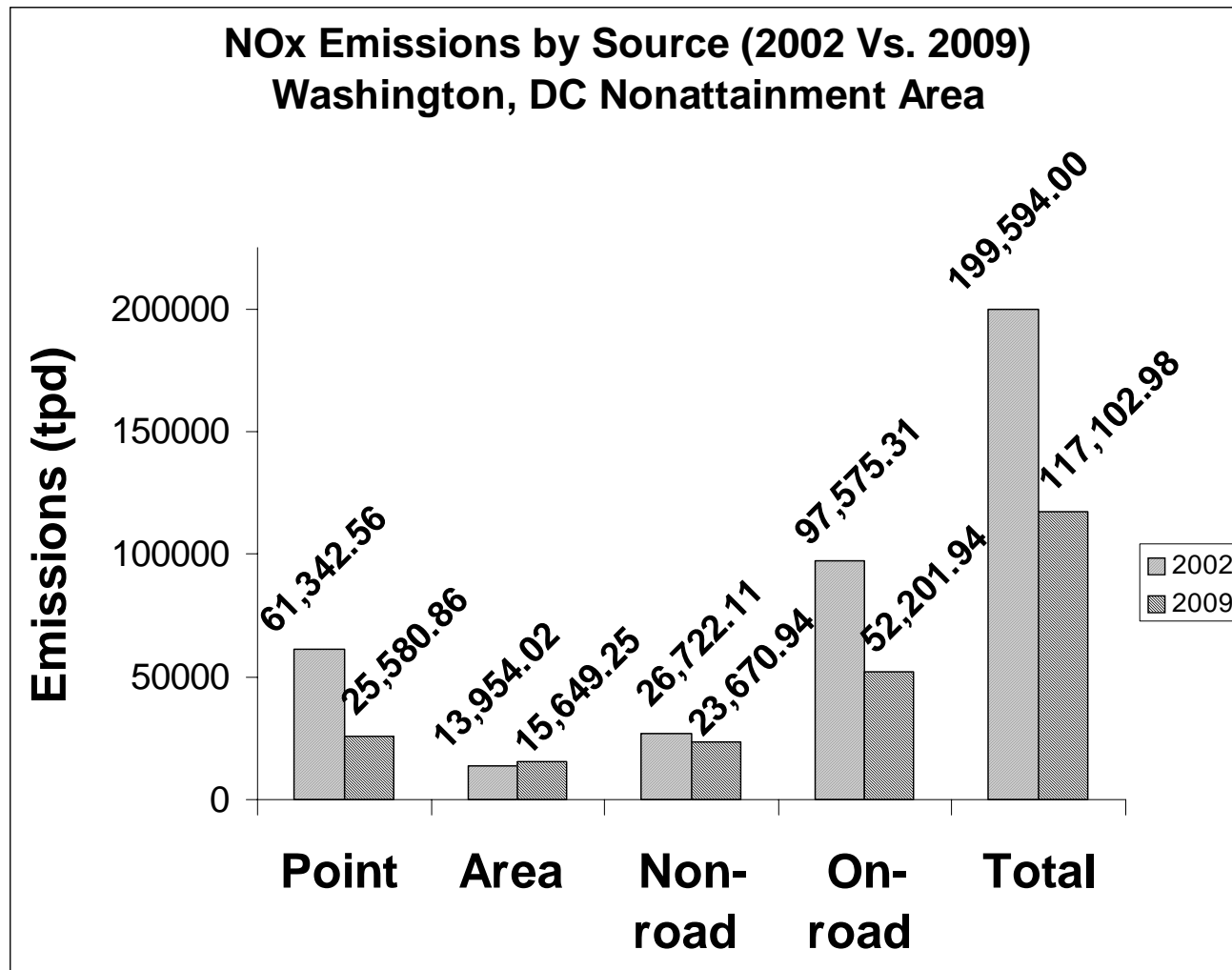
- **S02**

- Power Plants & Other Industries
- Coal Combustion – Industrial
- Coal Combustion – Commercial/Institutional
- Residential Distillate Oil Combustion
- Motor Vehicles

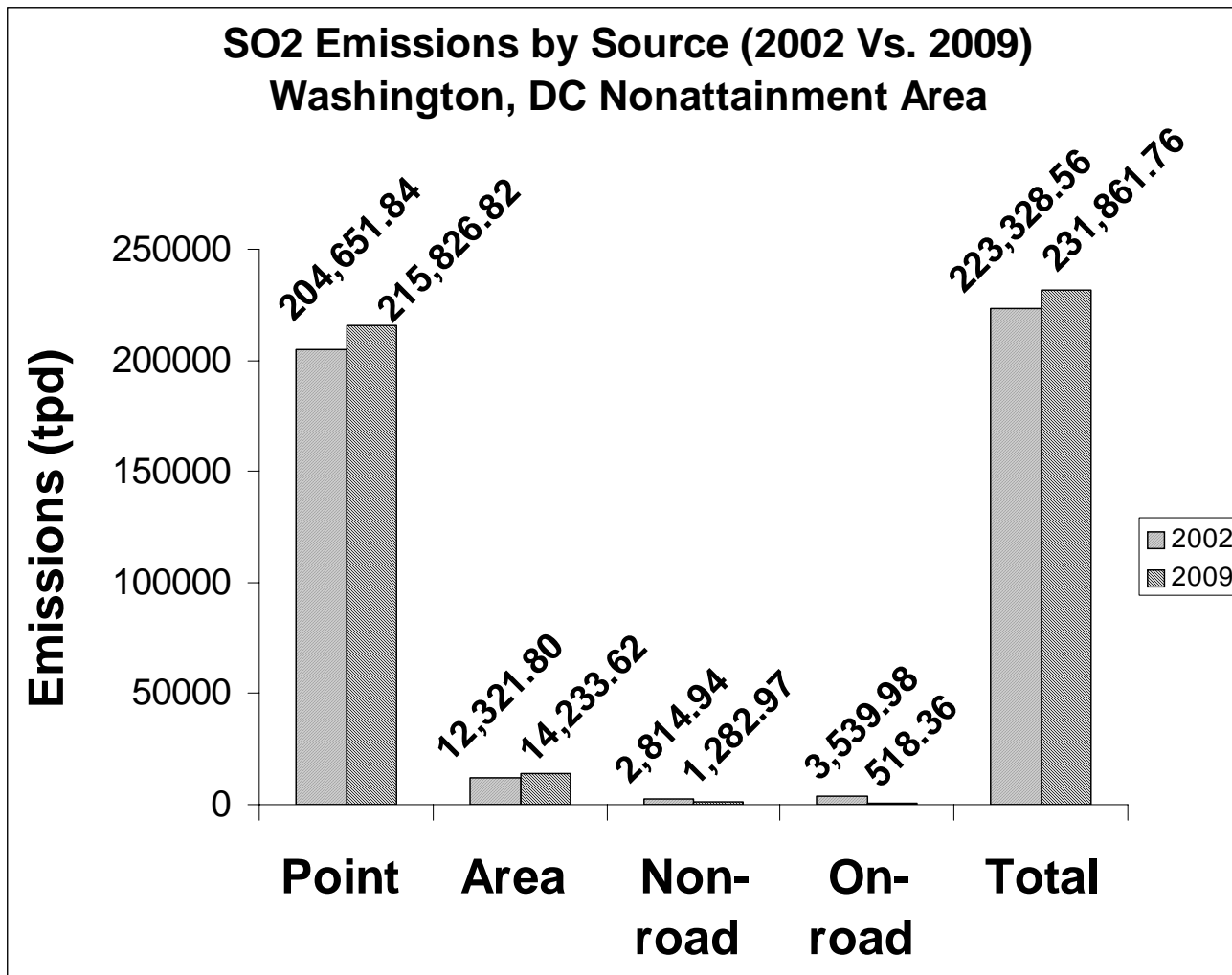
Comparison of 2002 & 2009 Emissions Inventories



Comparison of 2002 & 2009 Emissions Inventories



Comparison of 2002 & 2009 Emissions Inventories





Control Measures (2002 – 2009)

■ **Point Source**

- NOX SIP Call
- Clean Air Interstate Rule (CAIR) - VA & DC
- Maryland Healthy Air Act - MD
- Utility Reductions (Possum Point Fuel Conversion) -VA



Control Measures (2002 – 2009)

- **Area Source**

- Additional phase-in of reductions from National Locomotives Rule

- **Nonroad Source**

- 2004 Nonroad Heavy Duty Diesel Rule
- Additional phase-in of technology rules implemented by 2002.
- Low Fuel Sulfur



Control Measures (2002 – 2009)

- **Onroad Source**

- Heavy-Duty Diesel Engine Rule (2004)
- Heavy-Duty Diesel Engine Rule (2007)
- Tier 2 Motor Vehicle Emission Standards
- I&M Programs



Emissions Table

Draft BY 2002 Annual PM2.5 Inventory (Tons per Year)
Washington, DC-MD-VA Annual PM2.5 Nonattainment Area
 (11.13.2007)

Source	PM2.5				NOx				SO2			
	DC	MD	VA	Total	DC	MD	VA	Total	DC	MD	VA	Total
Point	126.53	3,497.31	545.71	4,169.55	1,317.46	45,829.43	14,195.67	61,342.56	2,467.55	164,784.06	37,400.23	204,651.84
Area	495.16	7,479.48	8,918.94	16,893.58	1,694.70	5,167.94	7,091.38	13,954.02	463.44	2,361.76	9,496.59	12,321.80
Non-road Model	287.98	954.05	1,088.94	2,330.98	3,066.20	8,918.42	10,476.58	22,461.20	343.11	801.09	991.41	2,135.61
Non-road Source	10.73	53.39	223.23	287.35	469.44	1,054.46	2,737.00	4,260.91	33.35	74.93	571.05	679.33
Total Non-road	298.71	1,007.45	1,312.17	2,618.33	3,535.64	9,972.89	13,213.58	26,722.11	376.46	876.03	1,562.46	2,814.94
On-road	156.27	841.18	727.25	1,724.70	8,827.37	47,640.16	41,107.78	97,575.31	289.88	1,734.88	1,515.22	3,539.98
Total	1,076.67	12,825.42	11,504.07	25,406.17	15,375.17	108,610.42	75,608.41	199,594.00	3,597.33	169,756.73	49,974.50	223,328.56

Source	VOC				NH3				PM10			
	DC	MD	VA	Total	DC	MD	VA	Total	DC	MD	VA	Total
Point	87.76	1,112.16	701.94	1,901.86	11.13	25.33	0.00	36.46	181.56	5,208.23	997.63	6,387.42
Area	6,313.88	31,774.11	34,395.80	72,483.79	12.59	3,113.84	543.72	3,670.14	2,680.45	23,359.83	29,797.93	55,838.21
Non-road Model	2,023.30	14,064.57	13,599.21	29,687.08	0.00	0.00	0.00	0.00	298.52	1,000.95	1,140.06	2,439.53
Non-road Source	19.54	159.78	625.86	805.18	0.00	0.00	0.00	0.00	11.66	56.70	240.64	309.00
Total Non-road	2,042.83	14,224.36	14,225.08	30,492.27	0.00	0.00	0.00	0.00	310.18	1,057.65	1,380.70	2,748.53
On-road	4,913.24	20,495.11	18,495.56	43,903.91	383.37	2,035.19	1,827.06	4,245.62	223.62	1,200.36	1,048.21	2,472.19
Total	13,357.71	67,605.74	67,818.37	148,781.83	407.08	5,174.36	2,370.78	7,952.22	3,395.81	30,826.06	33,224.47	67,446.34



Emissions Table

Draft AY 2009 (Controlled) Annual PM2.5 Inventory (Tons per Year)

Washington, DC-MD-VA Annual PM2.5 Nonattainment Area

(11.13.2007)

Source	PM2.5				NOx				SO2			
	DC	MD	VA	Total	DC	MD	VA	Total	DC	MD	VA	Total
Point	159.35	3,992.83	498.38	4,650.55	1,194.55	16,300.71	8,085.59	25,580.86	3,724.49	193,276.64	18,825.70	215,826.82
Area	519.29	8,203.50	9,883.06	18,605.85	1,778.14	5,569.68	8,301.43	15,649.25	480.63	2,585.56	11,167.43	14,233.62
Non-road Model	217.35	798.76	915.74	1,931.84	2,590.84	7,623.98	8,965.82	19,180.63	58.26	147.09	231.71	437.06
Non-road Source	9.49	54.44	230.79	294.72	331.05	862.19	3,297.07	4,490.31	34.77	89.96	721.18	845.91
Total Non-road	226.84	853.20	1,146.53	2,226.56	2,921.89	8,486.17	12,262.88	23,670.94	93.03	237.05	952.89	1,282.97
On-road	97.93	534.21	475.82	1,107.96	5,059.75	24,945.31	22,196.88	52,201.94	43.89	246.52	227.95	518.36
Total	1,003.40	13,583.74	12,003.79	26,590.93	10,954.33	55,301.87	50,846.78	117,102.98	4,342.02	196,345.77	31,173.97	231,861.76