

Top Source Categories Contributing to Regional Haze in Mid-Atlantic North Eastern Class I Areas

Source Category	SCCs	Control Option	Percent Reduction (Refers to SO2 unless otherwise specified)	Cost Effectiveness (\$/ton) [Refers to SO2 unless otherwise specified]
Electric Generating Units	1-01-xxx-xx	Fuel Switching from Bituminous to Subbituminous Coal	70	
		Fuel Switching from Coal to Natural Gas	>99	
		Fuel Cleaning (Coal)	20-25	
		FGD (Dry) High S Coal	40	
		FGD (Dry) Low S Coal	40	
		FGD (Spray Dry)	80-90	\$150-\$4000
		FGD (Wet) High S Coal	>90	\$200-\$5000
		FGD (Wet) Low S Coal	>90	\$200-\$5000
		Reduced S Residual Oil	Variable (directly related to fuel Sulfur content)	
Industrial, Commercial, and Institutional Boilers	1-02-xxx-xx, 1-03-xxx-xx, A21-02-001-000, A21-02-002-000, A21-02-004-000, A21-02-005-000, A21-03-001-000, A21-03-002-000, A21-03-004-000, A21-03-005-000	FGD (Dry) High S Coal	40	\$600-\$3,500
		FGD (Dry) Low S Coal	40	\$700-\$4,300
		FGD (Spray Dry)	90	\$400-\$3,920
		FGD (Wet) High S Coal	90	\$400-\$3,500
		FGD (Wet) Low S Coal	90	\$500-\$4,500
		FGD - Oil	90	\$700-\$10,160
		Wet ESP - Wood (1)	80-95	
		Spray Dry w/ESP - Wood (1)	60-75	
		Spray Dry w/Fabric Filter - Wood (1)	65-80	
		Dry FGD and ESP - Wood (1)	60-70	
		Dry FGD and Fabric Filter - Wood (1)	70-80	
		Spray Dry, Dry FGD and Fabric Filter - Wood (1)	80-90	
		ESP and wet FGD - Wood (1)	50-95	
		Fuel Switching from Bituminous to Subbituminous Coal	70	
		Fuel Switching from Coal to Natural Gas	>99	
		Fuel Cleaning (Coal)	20-25	
				Reduced S Residual Oil
Residential Wood Combustion and Open Burning	A21-04-008-xxx, A26-10-030-000	Reduce or eliminate wood burning (fireplace and woodstove)	PM/woodsmoke reduction	
		Use of high efficiency / less polluting woodstove technology (specially designed catalytic/non-catalytic woodstoves and pellet burners)	10-20 reduction in PM/woodsmoke (compared to conventional woodstove)	\$2,000 (based on cost of conventional woodstove replacement)
		Adopting good burning techniques such as using properly sized and properly seasoned wood	Reduction in PM/woodsmoke	
Home Heating Oil	A21-04-004-000, A21-04-005-000	Reduced Sulfur Fuel (2,500 ppm S --> 500 ppm S --> 15 ppm S)	Variable (directly related to fuel Sulfur content)	low Sulfur fuel (500 ppm S) costs ~\$0.01/gallon more than conventional fuel (2,500 ppm S)
		Improved Efficiency Boilers/Furnaces		
Cement Kilns	3-05-006-xx, 3-05-007-xx	Cement Kiln Feedstock Control (Low Sulfur Feed)	70-90	
		Fabric Filter with Absorbing Agent (Calcium Oxide)	50	
		Advanced FGD Systems	95-99.5	\$2,000-\$4,000 (Long Dry Kiln) / \$13,600-\$38,600 (Preheater Kiln)
		FGD (Wet)	90-99	\$2,000-\$6,200 (Long Dry Kiln) / \$9,700-\$64,600 (Preheater Kiln)
		Dry FGD	90-95	\$1,900-\$7,000 (Long Dry Kiln) / \$10,000-\$72,800 (Preheater Kiln)
		Lime Spray Injection w/ Fabric Filter or ESP		
Lime Kilns	3-07-001-06	Alkaline Scrubbers		
Smelters	3-03-xxx-xx	Dry Scrubber, Lime Spray Dryer, and Low Sulfur Coal	92	

Information on control options from:

1. Assessment of Control Technology Options for BART-Eligible Sources, NESCAUM, March 2005
2. Controlling Fine Particulate Matter Under the Clean Air Act: A Menu of Options, STAPPA-ALAPCO, March 2006

Note (1): Referenced control also reduces PM emissions by 95 - 99.9%.

Top 16 Sources Contributing to Regional Haze in Mid-Atlantic North Eastern Class I Areas

Number	State	Facility ID	Facility	Primary Emissions Point Descriptions (1)	Point Number (1)	SCC (1)	BART Source	2002 SO2 Total (Tons) (1,2)	Design Capacity (1)	Existing Control (1)	Control Option	Percent Reduction	Ton per Year Reduction	Cost Effectiveness (\$/ton) (5)
1	DE	1000300016	MOTIVA ENTERPRISES LLC - DELAWARE CITY (3)	Fluid Coker CO Boiler Cracker CO Boiler	002 012	10201402 10201402	No No	29,747 18,327 11,420	676 E6BTU 679 E6BTU	Yes Yes	Regenerative Wet Gas Scrubber Regenerative Wet Gas Scrubber	98.1 98.1	15000 13000	3500 3500
2	NY	8261400205	KODAK PARK DIVISION	Coal and Residual Boiler	U00015	10200401, 10200206, 10200203, 10200501, 10200202	yes	23,508 23,797			FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal FGD - Oil	40 40 90 90 90 90	9,519 9,519 21,417 21,417 21,417 21,417	\$600-\$3,500 \$700-\$4,300 \$400-\$3,920 \$400-\$3,500 \$500-\$4,500 \$700-\$10,160
3	OH	0671010028	MW CUSTOM PAPERS LLC - CHILLICOTHE MILL					23,216						
4	TN	0003	EASTMAN CHEMICAL COMPANY	14 Coal Stoker Boilers 5 Coal Tangential Boilers 2 Coal Tangential Boilers	020101 021520 261501	10200204 10200202 10200202		22,882 1,645 16,855 1,163	967 E6BTU 2610 E6BTU E6BTU		FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	9,153 9,153 20,594 20,594 20,594	\$600-\$3,500 \$700-\$4,300 \$400-\$3,920 \$400-\$3,500 \$500-\$4,500
5	MD	001-0011	WESTVACO FINE PAPERS	Coal Cyclone Boiler Coal Tangential Boiler	1 2	10200203 10200212	yes	19,083 19,160 8,923			FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	7,633 7,633 17,175 17,175 17,175	\$600-\$3,500 \$700-\$4,300 \$400-\$3,920 \$400-\$3,500 \$500-\$4,500
6	NY	4012400001	LAFARGE BUILDING MATERIALS INC	Cement Kiln	041000	30500706	yes	14,800 14,800						
7	WV	0002	PPG INDUSTRIES INC	Coal Boiler Coal Boiler Coal Boiler	001 002 003	10200202 10200202 10200202		12,678 3,538 2,069 7,071			FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	5,071 5,071 11,410 11,410 11,410	\$600-\$3,500 \$700-\$4,300 \$400-\$3,920 \$400-\$3,500 \$500-\$4,500
8	IL	179060ACR	WILLIAMS ETHANOL SERVICES INC					12,244						
9	IL	031012AB1	CORN PRODUCTS INTERNATIONAL INC					9,281						
10	PA	421330016	PH GLATFELTER CO/SPRING GROVE	Coal Boiler Coal Boiler	034 035	10200202 10200202	yes	7,855 4,297 3,568	363.7 E6BTU 262.3 E6BTU		FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	3,142 3,142 7,070 7,070 7,070	\$800-\$2,500 \$800-\$3,000 \$600-\$2,600 \$500-\$2,700 \$700-\$3,500
11	OH	1677010193	GOODYEAR TIRE & RUBBER CO.					5,903						
12	VA	00001	Stone Container Corp (d/b/a Smurfit-Stone Contain)	Coal Tangential Boiler	2	10200212		3,379 3,379	1056 Ton		FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	1,352 1,352 3,041 3,041 3,041	\$600-\$3,500 \$700-\$4,300 \$400-\$3,920 \$400-\$3,500 \$500-\$4,500
13	NY	4192600021	ST LAWRENCE CEMENT CORP-CATSKILL QUARRY	Cement Kiln	U00K18	30500706	yes	3,329 3,329						
14	ME	2301900056	GREAT NORTHERN PAPER INC MILL WEST	Residual Oil Boiler Residual Oil Boiler Residual Oil Boiler Residual Oil Boiler Residual Oil Boiler	001 002 003 004 005	10200401 10200401 10200401 10200401 10200401	yes	1,842 1,049 943 175 1,842 528	370 E6BTU 370 E6BTU 370 E6BTU 740 E6BTU 592 E6BTU		FGD - Oil FGD - Oil FGD - Oil FGD - Oil	90 90 90 90	944 849 158 1,658	\$700-\$7,801 \$700-\$7,801 \$700-\$7,801 \$700-\$7,801
15	DE	1000100127	NRG ENERGY CENTER DOVER LLC	Wall Fired Coal Boiler	001	10200219		1,836 1,836	243 E6BTU		FGD (Dry) High S Coal FGD (Dry) Low S Coal FGD (Spray Dry) FGD (Wet) High S Coal FGD (Wet) Low S Coal	40 40 90 90 90	734 734 1,652 1,652 1,652	\$800-\$2,500 \$800-\$3,000 \$600-\$2,600 \$500-\$2,700 \$700-\$3,500
16	ME	2302500027	SAPPI - SOMERSET	Multi-fuel Boiler	001	10200401, 10200902, 10200903, 10200799, 10201301	yes	1,734 2,994	848 E6BTU		FGD - Oil Wet ESP - Wood (4) Spray Dry w/ESP - Wood (4) FGD (Dry) Low S Coal Spray Dry w/Fabric Filter - Wood (4) Dry FGD and ESP - Wood (4) Dry FGD and Fabric Filter - Wood (4) Spray Dry, Dry FGD and Fabric Filter - Wood (4) ESP and wet FGD - Wood (4)	90 80-95 60-75 40 65-80 60-70 70-80 80-90 50-95	2,695 2,395-2,844 1,796-2,245 734 1,945-2395 1,796-2,096 2,096-2395 2,395-2,695 1,497-2944	

Information on control options from:

- Assessment of Control Technology Options for BART-Eligible Sources, NESCAUM, March 2005
- Controlling Fine Particulate Matter Under the Clean Air Act: A Menu of Options, STAPPA-ALAPCO, March 2006

Note: BART Sources outside of MANE-VU have not been identified.

Note (1): Emission source description, point number, point source emissions, SCC, design capacity, existing control information is from the 2002 NEI.

Note (2): Bolded emission source totals are 2002 emissions supplied by MARAMA.

Note (3): Source has installed or is in the process of installing controls due to Consent Decree

Note (4): Referenced control also reduces PM emissions by 95 - 99.9%.

Note (5): Control costs vary by the size of the emission unit. Control of large emission units is generally more cost effective than controlling small units.