

EPA's Post-IRA 2022 Reference Case Documentation Supplement Supporting RIA Analysis of Proposed MATS RTR

1. Overview

This supplement includes details on the modeling assumptions applied in EPA's analysis of the Proposed MATS RTR. The baseline for this analysis is EPA's Post-IRA 2022 Reference Case.¹ In addition to the baseline, EPA analyzed two scenarios using IPM: a proposed option and a more stringent alternative. Each of these scenarios reflects mercury and filterable PM emissions limits that are lower than the allowable limits in the baseline. The sections below describe the modeling approach utilized to reflect the mercury and filterable PM limits in each of these two scenarios.

2. Mercury Standard

In each of the scenarios, EPA modeled a mercury limit of 1.2 lbs/TBtu for all lignite-fired EGUs. This limit is modeled endogenously and reflects the assumption that each of the lignite-fired EGUs replace standard powdered activated carbon (PAC) sorbent with halogenated premium PAC sorbent. The incremental variable cost of each applicable EGU is estimated based on information supplied by Sargent & Lundy,² and the modeled emissions are reduced to reflect compliance with an emissions rate of 1.2 lbs/TBtu.

3. Filterable PM Standards (Surrogate Standard for Non-Hg HAP metals)

For the filterable PM standard, PM emissions controls and associated costs are modeled based on information available in the memorandum titled: "2023 Technology Review for the Coal- and Oil-Fired EGU Source Category" which is available in the docket. This memorandum summarizes the current filterable PM emissions rate for each existing EGU. The regulatory options analyzed are filterable PM emission standards for existing coal-fired EGUs of 0.010 lb/MMBtu and 0.006 lb/MMBtu, which represent the proposed option and the more stringent alternative, respectively. Based on the difference between the emissions rates detailed in the 2023 Technology Review memorandum and the regulatory option being analyzed, the EPA assumed various levels of ESP upgrades, upgrades to existing fabric filters, or new fabric filter installations in each of the modeled scenarios. These assumptions are implemented in the model by applying the cost of the assumed controls beginning in 2028 and reducing PM emission factors accordingly. The model outputs report the capital component of these investments as an FOM cost. Calculating the incremental cost between the baseline and the scenarios analyzed requires converting that upfront cost to a stream of capital using the financial assumptions documented in chapter 10 of the IPM documentation.

Table 1 summarizes the cost and filterable PM emissions reduction associated with each control in the modeling. Table 2 presents the adjustments necessary to correctly interpret the total annual production cost table in the model output. The PM control improvements assumed for each unit in each of the two scenarios analyzed is detailed in Table 3.

¹ Documentation for EPA's Power Sector Modeling Platform v6 Using the Integrated Planning Model Post-IRA IPM 2022 Reference Case is available at: <https://www.epa.gov/airmarkets/power-sector-modeling>

² Mercury Control Incremental Operating Cost Methodology, Sargent & Lundy (2023)

Table 1. Cost and Performance Assumptions for Filterable PM Control Improvements

PM Control Strategy	Capital Cost	Filterable PM ₁₀ Reduction	Filterable PM _{2.5} Reduction
Minor ESP Upgrades	\$16.5/kW	7.5%	5%
Typical ESP Upgrades	\$55/kW	15%	10%
ESP Rebuild	\$88/kW	40% (0.005lb/MMBtu floor)	26.7% (0.005lb/MMBtu floor)
Upgrade Existing FF Bags	Unit-specific, approximately \$15K - \$500K annual O&M	50% (0.002 lb/MMBtu floor)	33.3% (0.002 lb/MMBtu floor)
New Fabric Filter (6.0 A/C Ratio)	Unit-specific, \$150-360/kW	90% (0.002 lb/MMBtu floor)	60% (0.002 lb/MMBtu floor)

Sources: PM Incremental Improvement Memo, Sargent & Lundy (2023); Analysis of PM emission control costs and capabilities, Staudt (2023); EPA Memo “2023 Technology Review for the Coal- and Oil-Fired EGU Source Category” (Docket ID. No: EPA-HQ-OAR-2018-0794); Particulate Control Cost Development Methodology, Sargent & Lundy (2017)

Table 2. Adjustments to Model Output for Total Annual Production Cost [Million US2019\$]

Cost Component	2028	2030	2035	2040	2045	2050	2055
Proposed Option							
Fixed O&M Adjustment	-386.5	0	0	0	0	0	0
Capital Adjustment	25.8	25.8	25.8	25.8	0	0	0
More Stringent Alternative							
Fixed O&M Adjustment	-749.4	0	0	0	0	0	0
Capital Adjustment	169.1	41.4	41.4	41.4	0	0	0

Note: Model output files are available in the docket. Incremental compliance cost is the difference between the baseline and the scenario analyzed, plus the adjustments reported in this table.

Table 3. Unit-Level Control Assumptions for the Proposed Option and More Stringent Alternative

NEEDS ID	PLANT NAME	UNIT ID	STATE	PROPOSED OPTION	MORE STRINGENT ALTERNATIVE
10113_B_CFB1	John B Rich Memorial Power Station	CFB1	Pennsylvania	Bag Upgrade	Bag Upgrade
10113_B_CFB2	John B Rich Memorial Power Station	CFB2	Pennsylvania	Bag Upgrade	Bag Upgrade
10343_B_SG-101	Foster Wheeler Mt Carmel Cogen	SG-101	Pennsylvania	Bag Upgrade	Bag Upgrade
1082_B_3	Walter Scott Jr Energy Center	3	Iowa	Bag Upgrade	Bag Upgrade
1893_B_4	Clay Boswell	4	Minnesota	Bag Upgrade	Bag Upgrade
2103_B_1	Labadie	1	Missouri	ESP Rebuild	New FF
2103_B_2	Labadie	2	Missouri	ESP Rebuild	New FF
2103_B_3	Labadie	3	Missouri	ESP Rebuild	New FF
2103_B_4	Labadie	4	Missouri	ESP Rebuild	New FF
3954_B_1	Mt Storm	1	West Virginia	Minor ESP Upgrade	New FF
3954_B_2	Mt Storm	2	West Virginia	Minor ESP Upgrade	New FF
3954_B_3	Mt Storm	3	West Virginia	Typical ESP Upgrade	New FF
50611_B_031	Westwood Generation LLC	031	Pennsylvania	Bag Upgrade	Bag Upgrade
6041_B_3	H L Spurlock	3	Kentucky	Bag Upgrade	Bag Upgrade
6076_B_3	Colstrip	3	Montana	New FF	New FF
6076_B_4	Colstrip	4	Montana	New FF	New FF
6146_B_1	Martin Lake	1	Texas	ESP Rebuild	New FF
6146_B_3	Martin Lake	3	Texas	Typical ESP Upgrade	New FF
6823_B_W1	D B Wilson	W1	Kentucky	ESP Rebuild	New FF
976_B_123	Marion	123	Illinois	Bag Upgrade	Bag Upgrade
10143_B_ABB01	Colver Power Project	ABB01	Pennsylvania	N/A	Bag Upgrade
1356_B_2	Ghent	2	Kentucky	N/A	Bag Upgrade
1356_B_3	Ghent	3	Kentucky	N/A	Bag Upgrade
136_B_2	Seminole (FL)	2	Florida	N/A	New FF
1393_B_6	R S Nelson	6	Louisiana	N/A	New FF
1733_B_1	Monroe (MI)	1	Michigan	N/A	New FF
1733_B_2	Monroe (MI)	2	Michigan	N/A	New FF
2364_B_1	Merrimack	1	New Hampshire	N/A	New FF
2364_B_2	Merrimack	2	New Hampshire	N/A	New FF
2817_B_1	Leland Olds	1	North Dakota	N/A	New FF
2823_B_B2	Milton R Young	B2	North Dakota	N/A	New FF
4078_B_3	Weston	3	Wisconsin	N/A	Bag Upgrade
470_B_3	Comanche (CO)	3	Colorado	N/A	Bag Upgrade
50974_B_UNIT 1	Scrubgrass Generating Plant	UNIT 1	Pennsylvania	N/A	Bag Upgrade
50974_B_UNIT 2	Scrubgrass Generating Plant	UNIT 2	Pennsylvania	N/A	Bag Upgrade
54634_B_1	St Nicholas Cogen Project	1	Pennsylvania	N/A	Bag Upgrade
56611_B_S01	Sandy Creek Energy Station	S01	Texas	N/A	Bag Upgrade
60_B_1	Whelan Energy Center	1	Nebraska	N/A	New FF
6009_B_2	White Bluff	2	Arkansas	N/A	New FF
6018_B_2	East Bend	2	Kentucky	N/A	New FF

NEEDS ID	PLANT NAME	UNIT ID	STATE	PROPOSED OPTION	MORE STRINGENT ALTERNATIVE
6065_B_2	latan	2	Missouri	N/A	Bag Upgrade
6068_B_3	Jeffrey Energy Center	3	Kansas	N/A	New FF
6096_B_2	Nebraska City	2	Nebraska	N/A	Bag Upgrade
6113_B_3	Gibson	3	Indiana	N/A	New FF
6146_B_2	Martin Lake	2	Texas	N/A	New FF
6177_B_U1B	Coronado	U1B	Arizona	N/A	New FF
6177_B_U2B	Coronado	U2B	Arizona	N/A	New FF
6179_B_2	Fayette Power Project	2	Texas	N/A	New FF
6180_B_1	Oak Grove (TX)	1	Texas	N/A	Bag Upgrade
6183_B_SM-1	San Miguel	SM-1	Texas	N/A	New FF
6204_B_2	Laramie River Station	2	Wyoming	N/A	New FF
628_B_4	Crystal River	4	Florida	N/A	New FF
628_B_5	Crystal River	5	Florida	N/A	New FF
645_B_BB04	Big Bend	BB04	Florida	N/A	New FF
6469_B_B1	Antelope Valley	B1	North Dakota	N/A	Bag Upgrade
6664_B_101	Louisa	101	Iowa	N/A	Bag Upgrade
6705_B_4	Warrick	4	Indiana	N/A	New FF
7030_B_U1	Major Oak Power	U1	Texas	N/A	Bag Upgrade
7030_B_U2	Major Oak Power	U2	Texas	N/A	Bag Upgrade
7790_B_1-1	Bonanza	1-1	Utah	N/A	Bag Upgrade
8042_B_2	Belews Creek	2	North Carolina	N/A	New FF
8066_B_BW73	Jim Bridger	BW73	Wyoming	N/A	New FF
8066_B_BW74	Jim Bridger	BW74	Wyoming	N/A	New FF
8069_B_2	Huntington	2	Utah	N/A	Bag Upgrade
8102_B_1	Gavin Power, LLC	1	Ohio	N/A	New FF