Updates in Power Sector Modeling Baseline Projections for 2015 Ozone NAAQS Actions

This document describes the updates made in the EPA's Power Sector Modeling assumptions that are incremental to the EPA's Power Sector Modeling Platform v6 using IPM Summer 2021 Reference Case.

The Updated Summer 2021 Reference Case uses NEEDS rev: 08_03_2022 (NEEDS Summer 2022) reflecting the updates in retirements and committed units as of Summer 2022, in addition to unit level comments the Agency has received during the comment period of the Proposed Good Neighbor Plan and the Proposed 2015 Ozone NAAQS SIP Disapprovals that are determined to be accurate. Modeling inputs also include some additional updates based on EPA's research. The list of updates is given below:

i) Retirements from NEEDS rev: 08_03_2022 are implemented.
ii) IPM-based projected economic retirement capability is deactivated for year 2023 reflecting the notion that any 2023 retirements are likely already announced and captured through the aforementioned NEEDS file.
iii) Committed new units from NEEDS rev: 08_03_2022 are implemented with the exception of new units for new solar and new wind units were still in the "planned" status rather than a "under construction" or "approved" status.
iv) IPM projected economic new builds are allowed to ensure IPM feasibility in 2023.
v) Combined cycle unit NO_x rates are updated and reflect a methodology producing more representative rates.
vi) Illinois Climate and Equitable Jobs Act related requirements are implemented.
    a. A new 100% clean energy constraint in 2050 in Illinois is implemented. Also updated are the IL RPS standards to 40% in 2030 and 50% in 2040.
    b. IPM retirements of Braidwood, Byron, and Dresden nuclear plants in the 2023 and 2025 run years are not allowed.
    c. Fossil units in Illinois are retired or/and their CO_2 emissions are limited as in the table below. CT/CC new builds in PJM_COMD and MIS_IL regions disabled in the 2045, 2050, and-2055 run years.

Private/Public	**Fuel**	**CO_2 Limit**	**Retirement Run Year**
Private	Coal	-	2030
	Oil	-	2030
	Gas	Reduce CO_2 emissions by 50% from the 2018-2020 average levels by 2035	2045
Public	Coal	Reduce CO_2 emissions by 45% from the 2018-2020 average levels by 2035	2050
	Oil	-	-
	Gas	-	2045

vii) Henry Hub gas prices of 5.07 2019$/MMBtu and 3.60 2019$/MMBtu are hardwired in the 2023 and 2025 run years, respectively. No changes are assumed to basis and seasonality. The 2023 modification captures near-term fuel price spikes and are not applied in subsequent years as market conditions are expected to return to alignment with base supply curve expectations.

viii) Coal supply curve costs in 2023 are adjusted using the cost scalars below to capture near-term fuel price spikes. These scalers are not applied for subsequent years as market conditions are expected to return to alignment with base supply curve expectations.

Affected Coal Grade	Coal Grade	Coal Supply Region	Coal Supply Region	Coal Basin	Cost Scalar
Central Appalachia 12,500 Btu, 1.2 SO2	BB	KE	Kentucky, East	Central Appalachia	1.156
Central Appalachia 12,500 Btu, 1.2 SO2	BB	TN	Tennessee	Central Appalachia	1.156
Central Appalachia 12,500 Btu, 1.2 SO2	BB	VA	Virginia	Central Appalachia	1.156
Central Appalachia 12,500 Btu, 1.2 SO2	BB	WS	West Virginia, South	Central Appalachia	1.156
Illinois Basin 11,800 Btu, 5.0 SO2	BG	IL	Illinois	East Interior (Illinois Basin)	1.757
Illinois Basin 11,800 Btu, 5.0 SO2	BG	IN	Indiana	East Interior (Illinois Basin)	1.757
Illinois Basin 11,800 Btu, 5.0 SO2	BG	KW	Kentucky, West	East Interior (Illinois Basin)	1.757
Northern Appalachia 13,000 Btu, <3.0 SO2	BE	MD	Maryland	Northern Appalachia	1.196
Northern Appalachia 13,000 Btu, <3.0 SO2	BE	OH	Ohio	Northern Appalachia	1.196
Northern Appalachia 13,000 Btu, <3.0 SO2	BE	PC	Pennsylvania, Central	Northern Appalachia	1.196
Northern Appalachia 13,000 Btu, <3.0 SO2	BE	PW	Pennsylvania, West	Northern Appalachia	1.196
Northern Appalachia 13,000 Btu, <3.0 SO2	BE	WN	West Virginia, North	Northern Appalachia	1.196
Powder River Basin 8,800 Btu, 0.8 SO2	SA	WH	Wyoming, Powder River Basin (8800)	Powder River Basin	1.46
Powder River Basin 8,400 Btu, 0.8 SO2	SA	WL	Wyoming, Powder River Basin (8400)	Powder River Basin	1.46

ix) The minimum capacity factor requirements of 10% to existing coal steam units in regions without capacity markets (non-NYISO, ISONE, PJM, and MISO regions) have been implemented as listed below.

Model Region	Model Region	Model Region	Model Region
ERC_REST	S_C_TVA	WEC_CALN	WECC_SNV
ERC_WEST	S_SOU	WEC_LADW	WECC_UT
ERC_PHDL	SPP_NEBR	WEC_SDGE	WECC_PNW
ERC_GWAY	SPP_N	WECC_SCE	WECC_CO
FRCC	SPP_KIAM	WECC_MT	WECC_WY
S_VACA	SPP_WEST	WEC_BANC	WECC_AZ
S_C_KY	SPP_SPS	WECC_ID	WECC_NM
S_D_AECI	SPP_WAUE	WECC_NNV	WECC_IID

x) For the coal units with post 2023 retirement years, the retrofit capital charge rates were recalculated based on a booklife equal to the remaining life in 2025. The year 2025 was chosen as 2025 contains calendar year 2026 mapping. 2026 is the first year of the GNP when SCR retrofits might be required.