Ozone & Reformulated Gas Update - Follow-up

Presentation to Louisville Metro Council Public Works Committee, by

Louisville Metro Air Pollution Control District

March 2, 2021

Ozone Formation

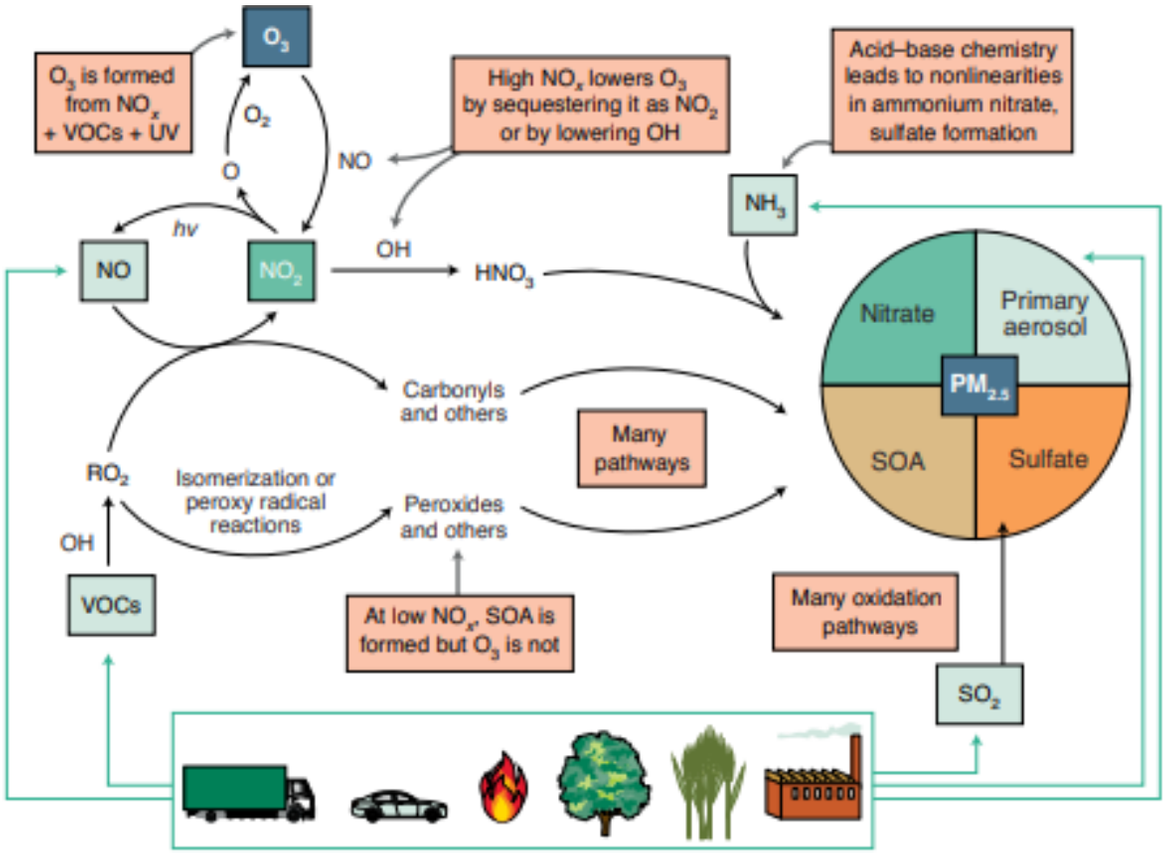
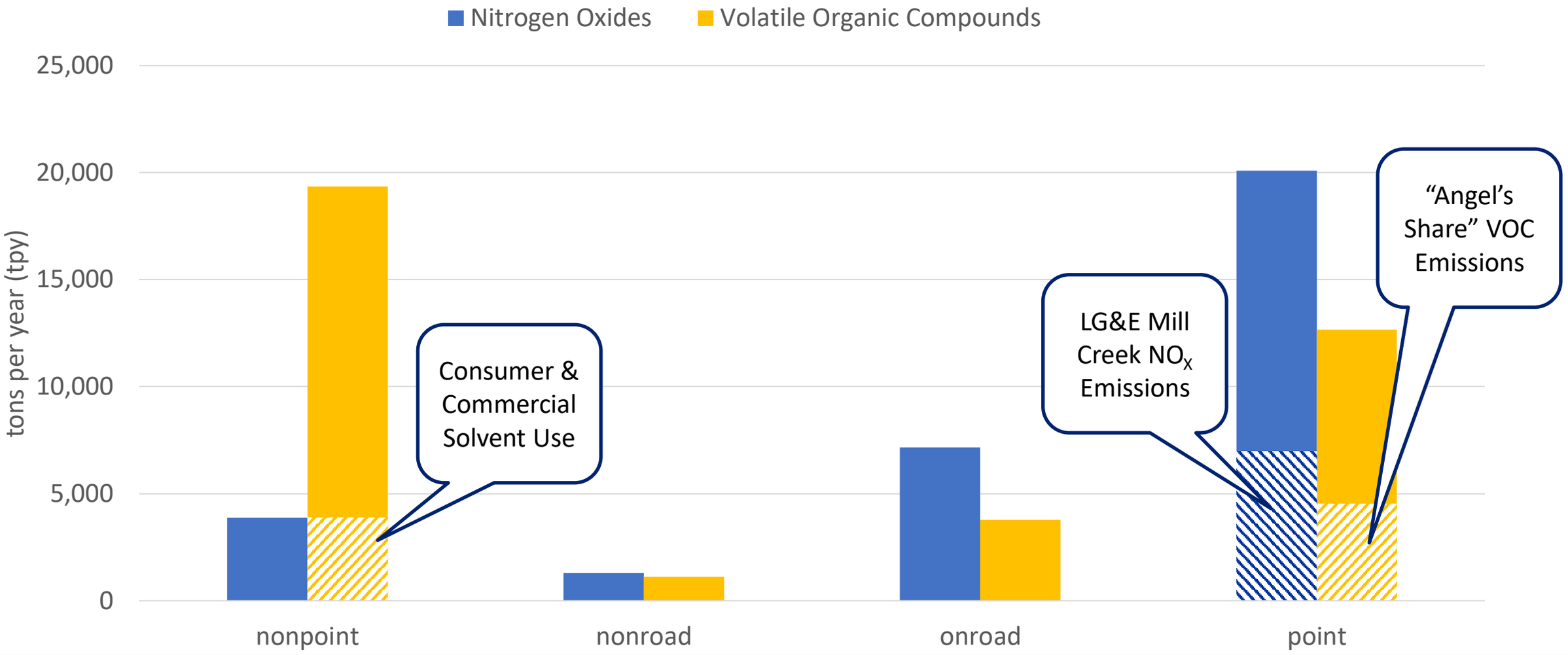


Fig. 1 | Simplified overview of the atmospheric chemistry of ozone and $PM_{2.5}$ formation. The orange boxes highlight key complexities, nonlinearities and uncertainties. Primary emissions are denoted by green arrows; secondary chemical reactions are denoted by black arrows.

- A series of complicated, non-linear reactions
- Which are linked to other pollutants:
  - Other criteria pollutants
    - Nitrogen oxides (NO_X) &
    - fine particulate matter ($PM_{2.5}$)
  - Volatile Organic Compounds (VOCs), many of which are air toxics

Source: Kroll, J.H., Heald, C.L., Cappa, C.D. *et al.* The complex chemical effects of COVID-19 shutdowns on air quality. *Nat. Chem.* **12,** 777–779 (2020). https://doi.org/10.1038/s41557-020-0535-z

Precursor Emissions



Source: 2017 National Emissions Inventory (NEI)

State Implementation Plans (SIPs), CAA §110(l), and Attainment

- CAA §110
  - **(a) Adoption of plan by State; submission to Administrator; content of plan; revision; new sources; indirect source review program; supplemental or intermittent control systems** (1) Each State shall… adopt and submit to the Administrator … a plan which provides for implementation, maintenance, and enforcement of such primary standard….
  - **(l) Plan revisions** …The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment ….

State Implementation Plans (SIPs), CAA §110(l), and Attainment

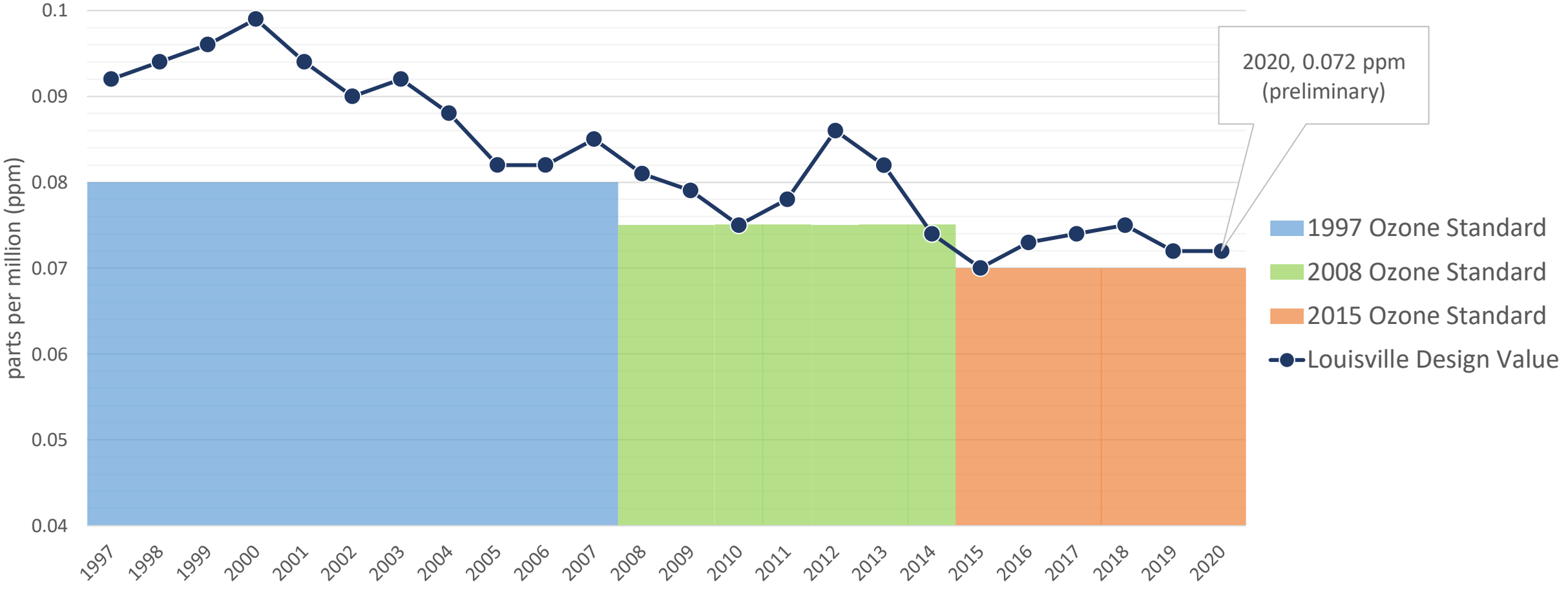
- CAA §182
  - **(a) Marginal Areas** Each State in which all or part of a Marginal Area is located shall … submit to the Administrator the State implementation plan revisions … described under this subsection…
    - Base Inventory
    - Plan updates (*e.g.*, Nonattainment New Source Review)
    - Emissions Statements
    - Offset Requirements
  - **(b) Moderate Areas**
    - Above + RACT + VET

Why did EPA approve NKY removal of RFG?

- 2008 Ozone NAAQS – Designated Attainment
- 2015 Ozone NAAQS
  - Not yet designated, but monitoring levels in attainment range
  - Downward trend, slight modeled increase in emissions
- "Given the results of Kentucky's emissions analysis, the downward trend in precursor emissions, and the current ozone concentrations in the Northern Kentucky Area, EPA is proposing to find that removing reliance on RFG requirements in Boone, Campbell, and Kenton Counties will not interfere with Kentucky's ability to maintain the 2008 8-hour ozone NAAQS."

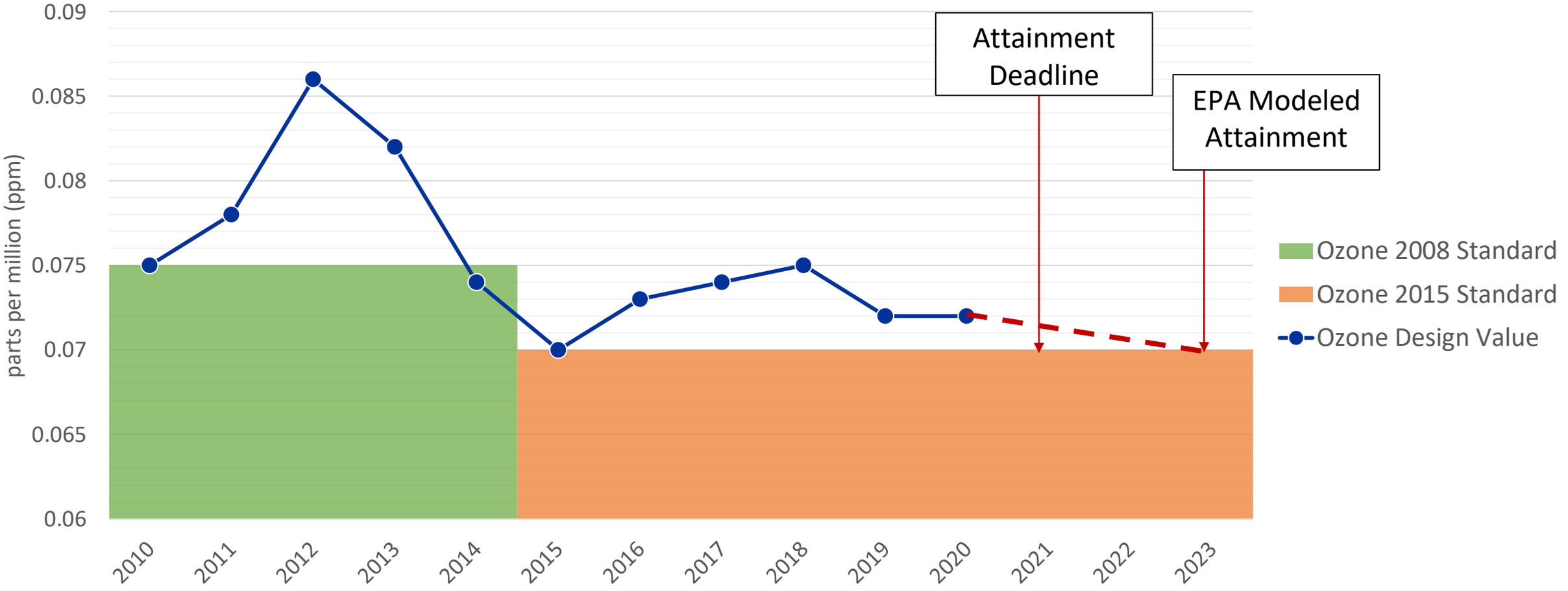
Source: 83 FR 6496, *see also* 83 FR 13872

Louisville Area National Ambient Air Quality Standard (NAAQS) for Ozone Trend



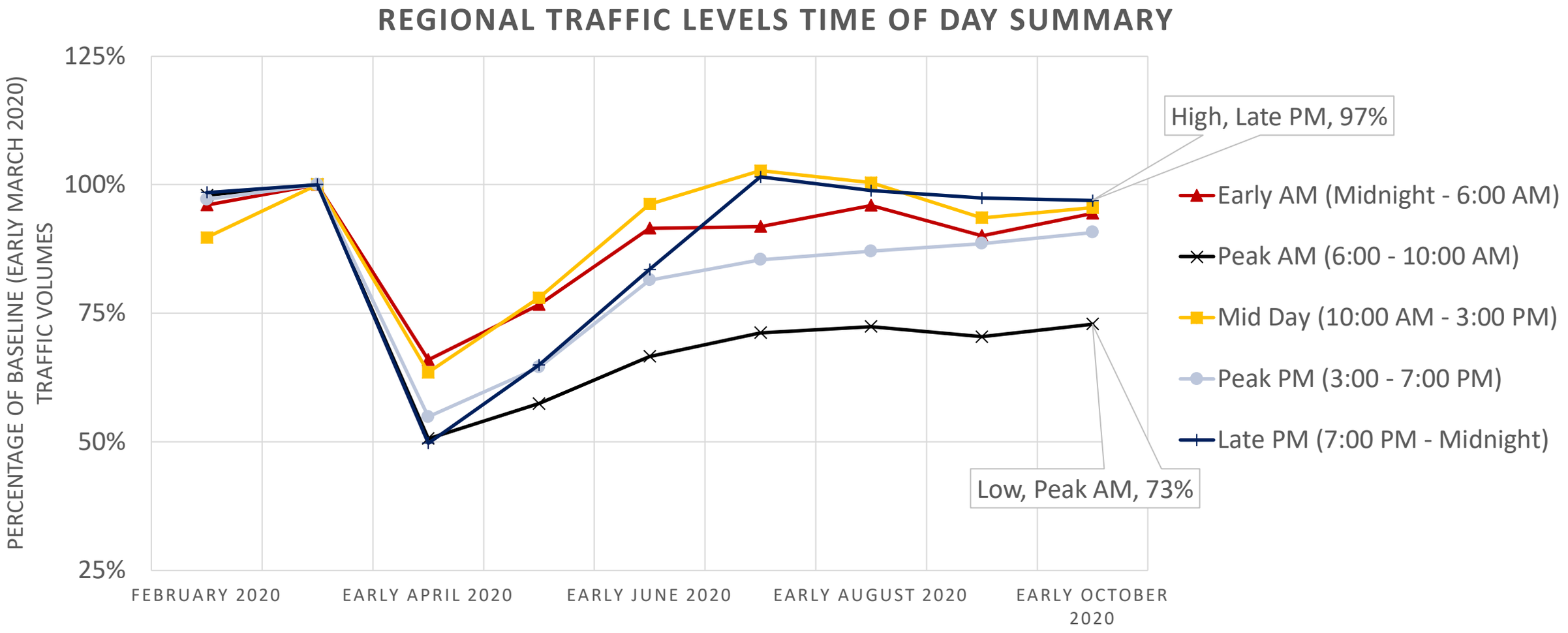
Source: APCD Air Monitoring

Louisville Area Ozone Projection



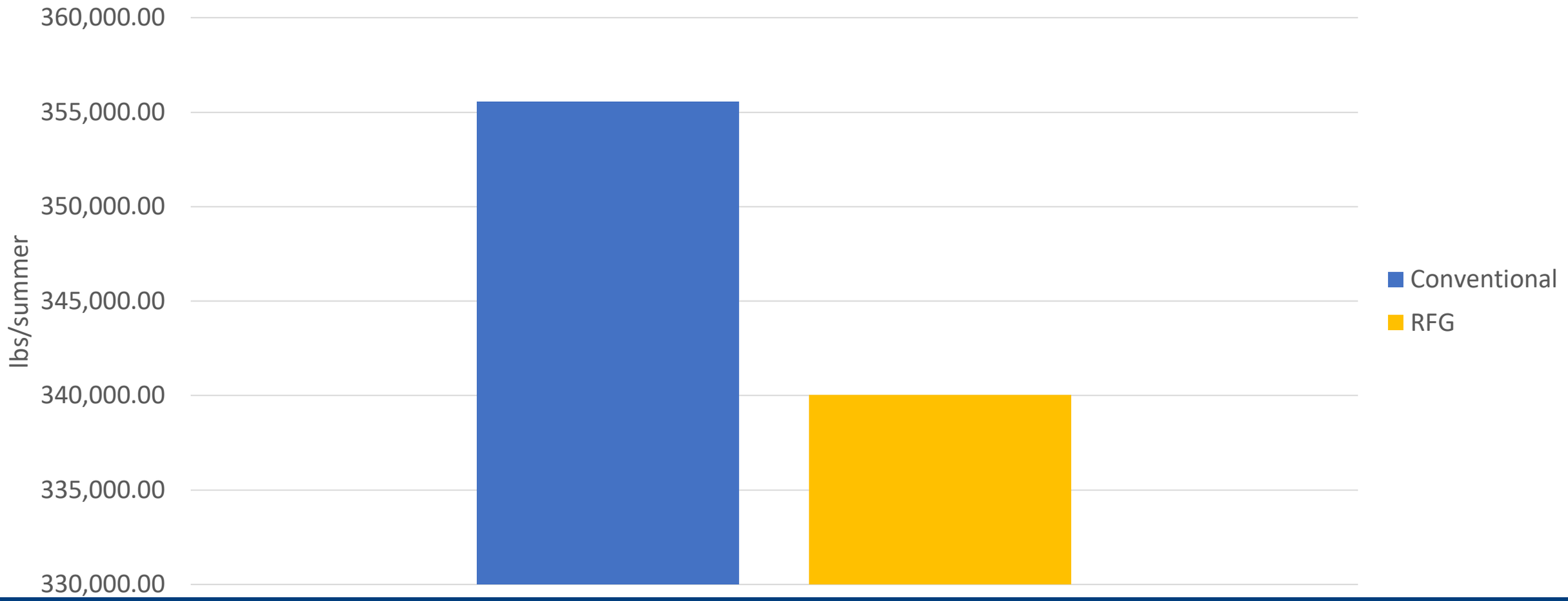
Source: APCD Air Monitoring, EPA Modeling for CSAPR Update

Traffice Effects of COVID-19



Data Source: KIPDA Transportation Division

Mobile Source Air Toxics (MSATs)



Source: KIPDA, APCD Modeling

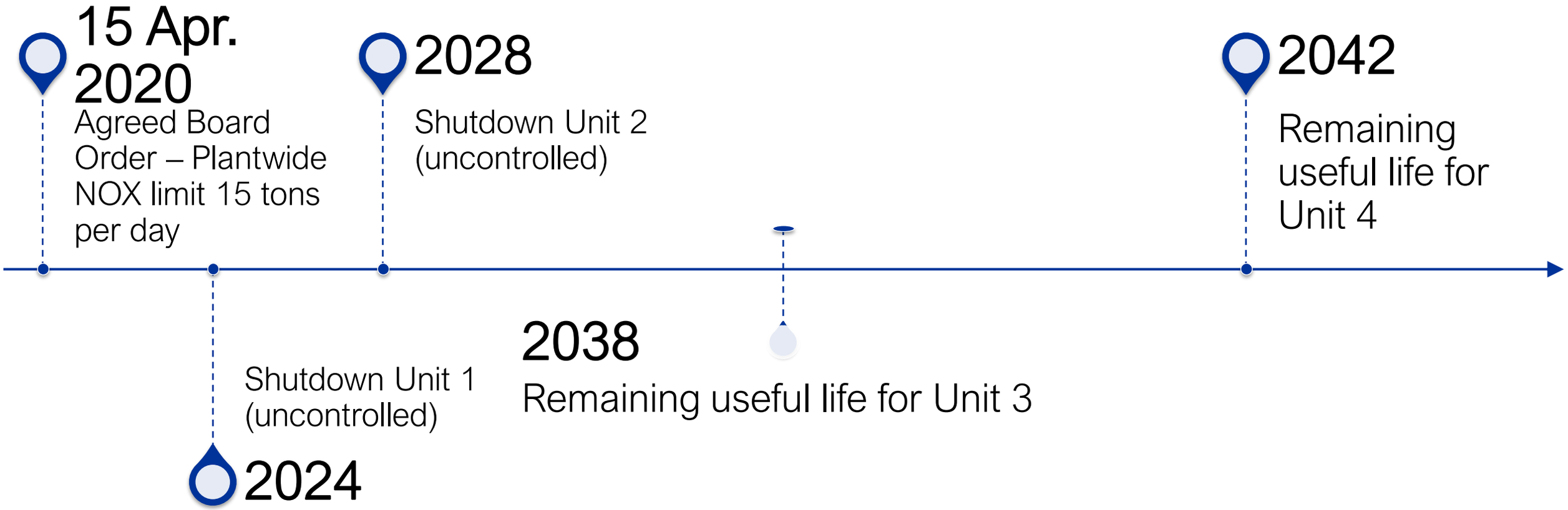
Ozone Status in Louisville

2020 8-Hour Ozone Maximum Values and Exceedances through October 31st

Date	# of 8-Hour Exceeds	# of Days Exceeds	Charlestown Clark County IN	New Albany Floyd County IN	Carrithers Jefferson County KY	Watson Lane Jefferson County KY	Cannons Lane Jefferson County KY	Buckner Oldham County KY	Shepherdsville Bullitt County KY
06/17/20	2	1	66.5	66.3	68.7	**71.8**	**71.5**	69.7	65.6
06/19/20	0	0	62.1	62.8	69.0	64.6	68.3	66.1	66.2
06/20/20	0	0	63.7	62.7	69.8	57.0	67.8	66.1	61.5
07/06/20	1	1	NA	66.5	54.6	57.1	**75.7**	46.8	49.2
07/07/20	2	1	NA	**83.6**	54.2	54.3	**72.0**	50.1	47.8
07/14/20	0	0	56.2	70.8	56.1	54.6	67.7	55.0	56.2
08/08/20	3	1	56.2	62.5	**73.3**	63.8	**73.5**	61.1	**75.1**
08/25/20	0	0	50.7	51.2	66.2	49.1	67.5	52.5	50.6
Total Exceeds	8	4	0	1	1	1	4	0	1
Truncated 4th Maximum			63	66	68	63	**71**	61	65

Source: APCD November 2020 Air Quality Report

LG&E Mill Creek Generating Station



AIR POLLUTION CONTROL DISTRICT

Sources: APCD ABO, LG&E Request for Bids, LG&E PSC Case No. 2020-00061

Questions?

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