Developing a Statewide Aircraft Emissions Inventory

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Outline

- **Background**
- Methodology and Data
- Draft Aircraft Emissions Inventory
- Discussion

Current Approach for California's Aircraft Emissions Inventory

- Periodically updated by air districts, submitted to CARB
- Some districts perform thorough evaluations, but others use generic emission factors that have not been updated since early 2000s
- Lack of consistency between districts on emissions factors and growth factors is a key driver for CARB developing a model at the statewide level

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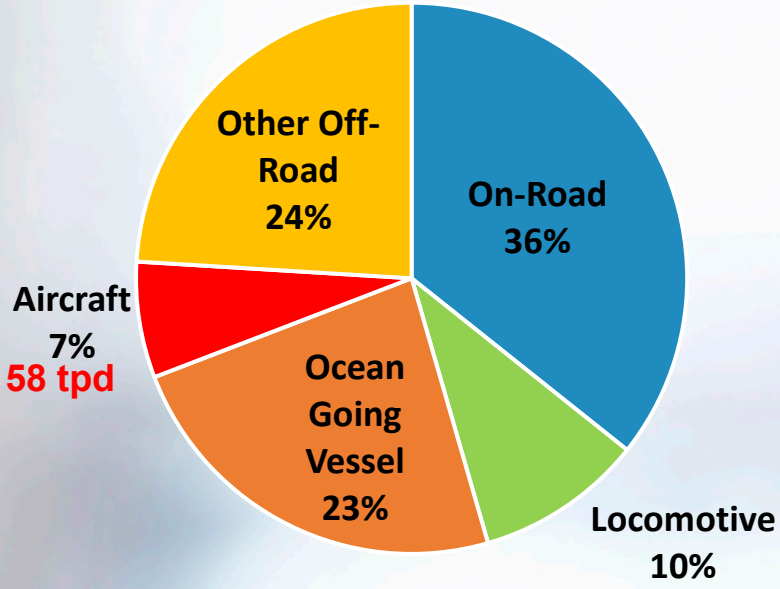
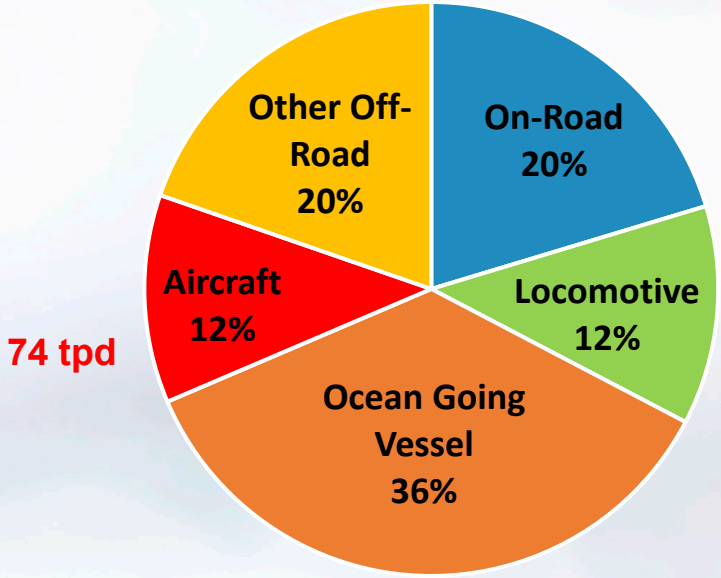
Statewide Mobile Source NOx Emissions

2023



2037



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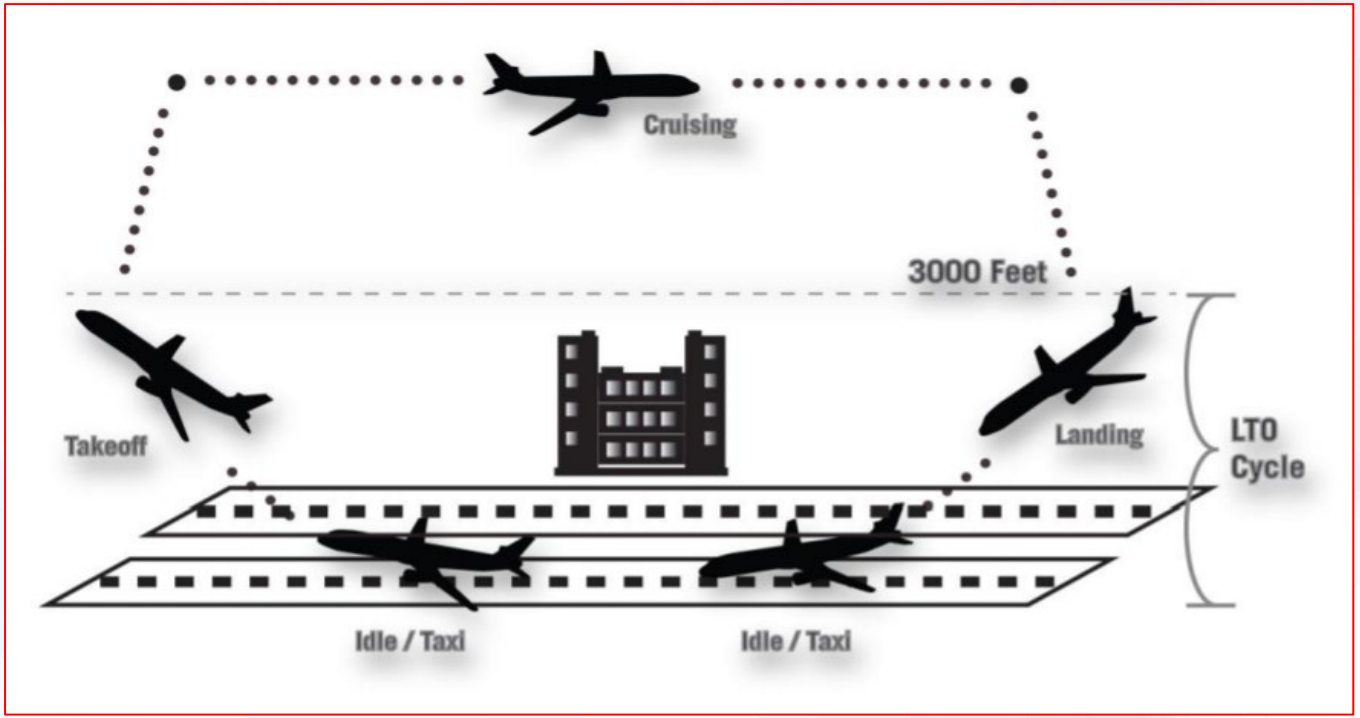
Source: 2022 CEPAM version 1.01 B

Landing and Take-Off (LTO) Cycle-Based Emission Inventory

- LTO is of concern
- Aviation Environmental Decision Tool (AEDT) from Federal Aviation Administration (FAA) is used
- Airframe and Engine combination (fleet mix) and operations



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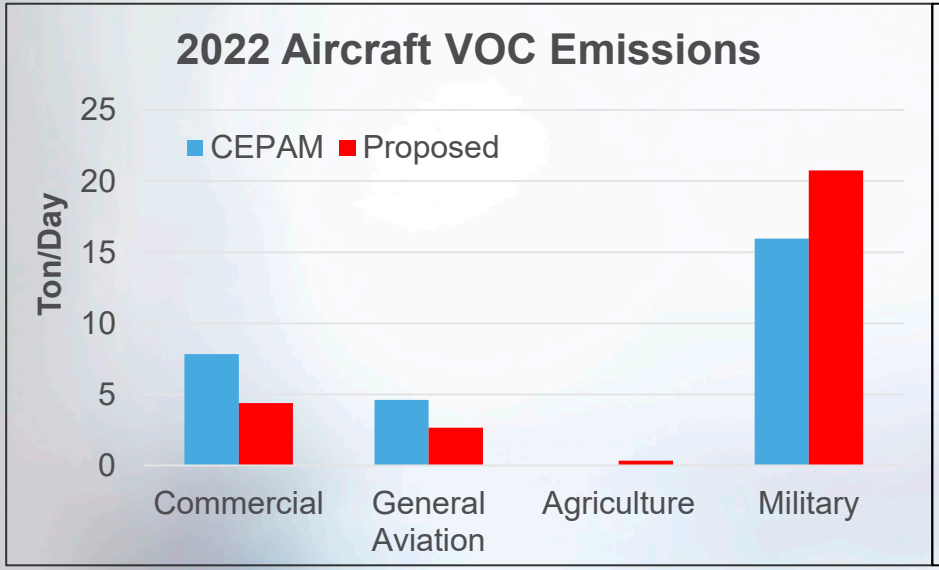
Data Inputs and Assumptions

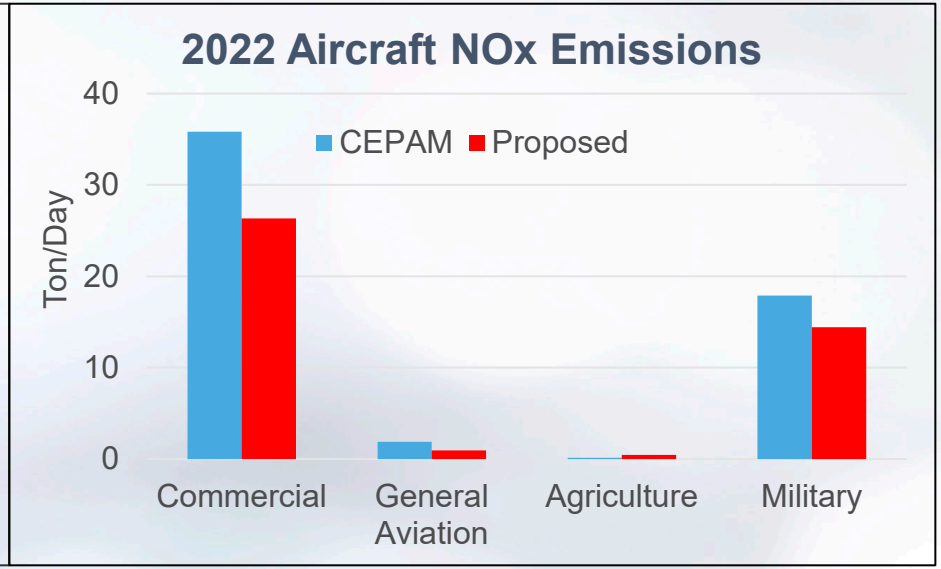
- Records from FlightAware for 2013 to 2022 used for **activity** by airframe and engine model (fleet mix)
- Airport specific (n=857) **mixing heights** calculated from 95th percentile of ERA5 month-hour averages
- FAA's Terminal Area Forecast (TAF) used to **forecast** activity by airport and category
- Local airport data, if available, replaced some fleet mix and activity forecasts (*e.g.*, for growth constraints)

Approaches for Military, Helicopters, and Crop Dusting

- Military emission factors from 2018 Air Force Air Emissions Guide For Air Force Mobile Sources (AFAEG) were used for military emission estimation
- AEDT was used for helicopter emission estimation except for PM, which uses Swiss Federal of Civil Aviation data instead (2015)
- Acreage-based emission factors were used for crop dusting aircraft emission estimation

Proposed Aircraft Emission Inventory





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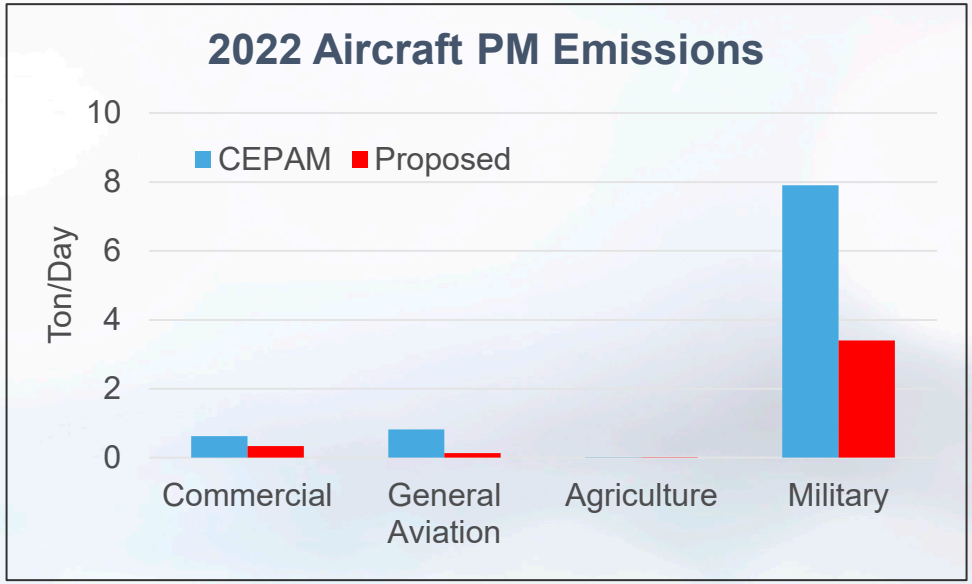
Proposed Aircraft Emission Inventory (Cont'd)



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Summary of Findings to Date

- Compared to air district results, new approach estimates are as follows for CY 2022:
  - 13 tpd (24%) less NOx
  - 0.3 tpd (1%) less ROG
  - 5.5 tpd (58%) less PM
- Commercial is largest category of NOx (63 percent)
- Incorporating helicopters and all 857 aviation facility emissions ensures comprehensive results

Next Steps

- Continue soliciting input from air districts and airports
- Refine and release model through a public process including a workshop and comment period
- Local air district or airport constraints or information may change results
- Estimated timeframe for model release: mid 2024