

CALIFORNIA GOOD NEIGHBOR
STATE IMPLEMENTATION PLAN
APPENDIX B

Emission Inventory for the 2024 Good Neighbor State Implementation Plan

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Introduction

The following documentation is provided to give a complete accounting of all categories and subcategories included in the emissions summary graph in the body of the 2024 Good Neighbor State Implementation Plan document. This includes grown and controlled values for 2012, 2019, and 2026.

Emission Inventory

CARB has developed a comprehensive, accurate, and current emissions inventory consistent with the requirements set forth in Section 182(a)(1) and Section 182(a)(3)(A) of the federal Clean Air Act. CARB staff conducted a thorough review of the inventory to ensure that the emission estimates reflect accurate emission reports for point sources, and that estimates for mobile and areawide sources are based on the most recent models and methodologies.

CARB also reviewed the growth profiles for point and areawide source categories and updated them as necessary to ensure that the emission projections are based on data that reflect historical trends, current conditions, and recent economic and demographic forecasts. Growth forecasts for most point and areawide sources were developed by CARB.

A. Emission Inventory Overview

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by industrial facilities, mobile sources, and areawide sources, such as consumer products and paint. They are fundamental components of an air quality plan, and serve critical functions, such as:

- 1) the primary input to air quality modeling used in attainment demonstrations;
- 2) the emissions data used for developing control strategies; and
- 3) a means to track progress in meeting the emission reduction commitments.

U.S. EPA regulations require that the emissions inventory contain emissions data for the two precursors to ozone formation: oxides of nitrogen (NO_x) and volatile organic compounds (VOC). The inventory included in this plan substitutes VOC with reactive organic gases (ROG), which in general represent a slightly broader group of compounds than those in U.S. EPA's list of VOCs.

B. Agency Responsibilities

CARB staff work to develop the emissions inventory for the state of California. In doing so, staff work with districts to develop point source emission estimates and staff develop the emission inventory for mobile sources, both on-road and off-road. CARB shares responsibility for developing estimates for the nonpoint (areawide) sources, such as consumer products and agricultural burning. CARB works with several State and local agencies, such as the Department of Transportation (Caltrans), the Department of Motor

Vehicles (DMV), the Department of Pesticide Regulation (DPR), and the California Energy Commission (CEC) to assemble activity information necessary to develop the mobile and areawide source emission estimates.

C. Inventory Base Year

The base year inventory forms the basis for all future year projections and also establishes the emission levels against which progress in emission reductions will be measured. CARB selected 2018 - the most recent year of modeling data available to ensure an accurate reflection of the Clean Truck Check rule and its impacts on emissions.

D. Forecasted Inventories

In addition to a base year inventory, U.S. EPA regulations also require future year inventory projections for specific milestone years. Forecasted inventories are a projection of the base year inventory that reflects expected growth trends for each source category and emission reductions due to adopted control measures. CARB develops emission forecasts by applying growth and control (GC) profiles to the base year inventory.

Growth profiles for point and areawide sources are derived from surrogates, such as economic activity, fuel usage, population, housing units, etc., that best reflect the expected growth trends for each specific source category. Growth projections were obtained primarily from government entities with expertise in developing forecasts for specific sectors, or, in some cases, from econometric models. Control profiles, which account for emission reductions resulting from adopted rules and regulations, are derived from data provided by the regulatory agencies responsible for the affected emission categories.

Projections for mobile source emissions are generated by models that predict activity rates and vehicle fleet turnover by vehicle model year along with activity inputs from the metropolitan planning organization (MPO). As with stationary sources, the mobile source models include control algorithms that account for all adopted regulatory actions.

E. Temporal Resolution

Planning inventories typically include annual as well as seasonal (summer and winter) emission estimates. Annual emission inventories represent the total emissions over an entire year (tons per year), or the daily emissions produced on an average day (tons per day). Seasonal inventories account for temporal activity variations throughout the year, as determined by category-specific temporal profiles. QA/QC occurs at the various stages of SIP emission inventory development. Base year emissions are assembled and maintained in the California Emission Inventory Development and Reporting System (CEIDARS). CARB inventory staff works with District staff, who are responsible for developing and reporting point source emission estimates, to verify these data are accurate. The locations of point sources, including stacks, are checked to ensure they are valid. Areawide source emission estimates are reviewed by CARB and District staff before their inclusion in the emission inventory. Additionally, CEIDARS is designed with automatic system checks to prevent

errors, such as double counting of emission sources. The system also makes various reports available to assist staff in their efforts to identify and reconcile anomalous emissions.

Future year emissions are estimated using the California Emission Projection Analysis Model (CEPAM), 2022 SIP Baseline Emission Projections, Version 1.01B. Growth and control (GC) factors are reviewed for each category and year along with the resulting emission projections. Year to year trends are compared to similar and past datasets to ensure general consistency. Emissions for specific categories are checked to confirm they reflect the anticipated effects of applicable control measures. Mobile categories are verified with mobile source staff for consistency with the on-road and off-road emission models.

NOx Emission Inventory Past and Future for California

NOx emission numbers provided below represent a data extraction on May 16, 2024, from CARB's CEPAM database. 2012, 2019, and 2026 were extracted from the SIP Baseline Emission Project - Version 1.01B, Summer, Base year of 2018, Grown and Controlled. OGV emissions extend to 100 nautical miles from shore.

SOURCE TYPE	CATEGORY	SUBCATEGORY	2012	2019	2026
STATIONARY	FUEL COMBUSTION	ELECTRIC UTILITIES	19.8	14.6	14.9
STATIONARY	FUEL COMBUSTION	COGENERATION	14.9	11.6	11.8
STATIONARY	FUEL COMBUSTION	OIL AND GAS PRODUCTION (COMBUSTION)	10.3	7.4	5.7
STATIONARY	FUEL COMBUSTION	PETROLEUM REFINING (COMBUSTION)	18.7	19.3	13.6
STATIONARY	FUEL COMBUSTION	MANUFACTURING AND INDUSTRIAL	53.4	47.7	47.6
STATIONARY	FUEL COMBUSTION	FOOD AND AGRICULTURAL PROCESSING	27.4	13.0	10.0
STATIONARY	FUEL COMBUSTION	SERVICE AND COMMERCIAL	39.4	30.1	30.1
STATIONARY	FUEL COMBUSTION	OTHER (FUEL COMBUSTION)	12.1	10.3	8.6
STATIONARY	WASTE DISPOSAL	SEWAGE TREATMENT	0.4	0.5	0.5
STATIONARY	WASTE DISPOSAL	LANDFILLS	1.2	1.1	1.0
STATIONARY	WASTE DISPOSAL	INCINERATORS	2.5	2.2	2.1
STATIONARY	WASTE DISPOSAL	SOIL REMEDIATION	0.0	0.0	0.0
STATIONARY	WASTE DISPOSAL	OTHER (WASTE DISPOSAL)	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	LAUNDERING	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	DEGREASING	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	PRINTING	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	ADHESIVES AND SEALANTS	0.0	0.0	0.0
STATIONARY	CLEANING AND SURFACE COATINGS	OTHER (CLEANING AND SURFACE COATINGS)	0.1	0.0	0.0
STATIONARY	PETROLEUM PRODUCTION AND MARKETING	OIL AND GAS PRODUCTION	2.6	2.2	1.8
STATIONARY	PETROLEUM PRODUCTION AND MARKETING	PETROLEUM REFINING	2.6	1.4	1.0
STATIONARY	PETROLEUM PRODUCTION AND MARKETING	PETROLEUM MARKETING	0.1	0.2	0.2

SOURCE TYPE	CATEGORY	SUBCATEGORY	2012	2019	2026
STATIONARY	PETROLEUM PRODUCTION AND MARKETING	OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0
STATIONARY	INDUSTRIAL PROCESSES	CHEMICAL	1.5	1.6	1.6
STATIONARY	INDUSTRIAL PROCESSES	FOOD AND AGRICULTURE	0.2	0.2	0.2
STATIONARY	INDUSTRIAL PROCESSES	MINERAL PROCESSES	40.1	37.9	38.1
STATIONARY	INDUSTRIAL PROCESSES	METAL PROCESSES	0.7	0.5	0.5
STATIONARY	INDUSTRIAL PROCESSES	WOOD AND PAPER	0.9	1.0	1.0
STATIONARY	INDUSTRIAL PROCESSES	GLASS AND RELATED PRODUCTS	6.0	2.5	2.7
STATIONARY	INDUSTRIAL PROCESSES	ELECTRONICS	0.0	0.0	0.0
STATIONARY	INDUSTRIAL PROCESSES	OTHER (INDUSTRIAL PROCESSES)	2.4	0.7	0.8
	STATIONARY SOURCES SUBTOTAL		257.4	206.3	193.8
AREAWIDE	SOLVENT EVAPORATION	CONSUMER PRODUCTS	0.0	0.0	0.0
AREAWIDE	SOLVENT EVAPORATION	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0
AREAWIDE	SOLVENT EVAPORATION	PESTICIDES/FERTILIZERS	0.0	0.0	0.0
AREAWIDE	SOLVENT EVAPORATION	ASPHALT PAVING / ROOFING	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	RESIDENTIAL FUEL COMBUSTION	36.1	32.4	28.6
AREAWIDE	MISCELLANEOUS PROCESSES	FARMING OPERATIONS	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	PAVED ROAD DUST	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	UNPAVED ROAD DUST	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	FIRES	0.2	0.3	0.3
AREAWIDE	MISCELLANEOUS PROCESSES	MANAGED BURNING AND DISPOSAL	6.3	6.7	6.7
AREAWIDE	MISCELLANEOUS PROCESSES	COOKING	0.0	0.0	0.0
AREAWIDE	MISCELLANEOUS PROCESSES	OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0
	AREAWIDE SOURCES SUBTOTAL		42.6	39.4	35.6
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT DUTY PASSENGER (LDA)	113.7	46.3	24.5
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 1 (LDT1)	27.8	11.8	5.4

SOURCE TYPE	CATEGORY	SUBCATEGORY	2012	2019	2026
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 2 (LDT2)	70.2	32.4	14.9
MOBILE	ON-ROAD MOTOR VEHICLES	MEDIUM DUTY TRUCKS (MDV)	58.2	30.0	11.9
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDGT1)	11.4	7.5	4.0
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDGT2)	1.4	1.0	0.6
MOBILE	ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY GAS TRUCKS (MHDGT)	4.1	2.0	0.9
MOBILE	ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY GAS TRUCKS (HHDGT)	1.6	0.1	0.1
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDDT1)	64.8	40.6	18.3
MOBILE	ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDDT2)	16.0	10.2	4.9
MOBILE	ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDDT)	103.3	64.5	31.9
MOBILE	ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY DIESEL TRUCKS (HHDDT)	366.0	202.1	138.1
MOBILE	ON-ROAD MOTOR VEHICLES	MOTORCYCLES (MCY)	6.2	6.3	6.1
MOBILE	ON-ROAD MOTOR VEHICLES	HEAVY DUTY DIESEL URBAN BUSES (UBD)	14.2	2.8	0.7
MOBILE	ON-ROAD MOTOR VEHICLES	HEAVY DUTY GAS URBAN BUSES (UBG)	0.1	0.1	0.0
MOBILE	ON-ROAD MOTOR VEHICLES	SCHOOL BUSES - GAS (SBG)	0.5	0.2	0.1
MOBILE	ON-ROAD MOTOR VEHICLES	SCHOOL BUSES - DIESEL (SBD)	7.3	7.2	5.6
MOBILE	ON-ROAD MOTOR VEHICLES	OTHER BUSES - GAS (OBG)	1.1	0.6	0.3
MOBILE	ON-ROAD MOTOR VEHICLES	OTHER BUSES - MOTOR COACH - DIESEL (OBC)	3.1	1.8	0.8
MOBILE	ON-ROAD MOTOR VEHICLES	ALL OTHER BUSES - DIESEL (OBD)	3.7	2.4	1.1
MOBILE	ON-ROAD MOTOR VEHICLES	MOTOR HOMES (MH)	3.4	2.1	1.4
MOBILE	OTHER MOBILE SOURCES	AIRCRAFT	43.5	48.9	58.4
MOBILE	OTHER MOBILE SOURCES	TRAINS	92.2	81.3	86.9
MOBILE	OTHER MOBILE SOURCES	SHIPS AND COMMERCIAL BOATS	0.0	0.0	0.0
MOBILE	OTHER MOBILE SOURCES	OCEAN GOING VESSELS	203.1	197.1	209.0
MOBILE	OTHER MOBILE SOURCES	COMMERCIAL HARBOR CRAFT	28.9	20.1	19.1
MOBILE	OTHER MOBILE SOURCES	RECREATIONAL BOATS	27.4	25.0	23.1
MOBILE	OTHER MOBILE SOURCES	OFF-ROAD RECREATIONAL VEHICLES	0.5	0.5	0.5
MOBILE	OTHER MOBILE SOURCES	OFF-ROAD EQUIPMENT	186.4	142.7	89.2
MOBILE	OTHER MOBILE SOURCES	OFF-ROAD EQUIPMENT (PERP)	35.5	23.7	11.9
MOBILE	OTHER MOBILE SOURCES	FARM EQUIPMENT	117.7	82.9	52.7

SOURCE TYPE	CATEGORY	SUBCATEGORY	2012	2019	2026
MOBILE	OTHER MOBILE SOURCES	FUEL STORAGE AND HANDLING	0.0	0.0	0.0
	MOBILE SOURCES SUBTOTAL		1613.2	1094.1	822.6
	ALL CATEGORIES TOTAL		1913.2	1339.9	1052.0