

Appendix B

Emissions Inventory



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Appendix B: Emissions Inventory

B.1 INTRODUCTION

An emissions inventory is a systematic listing of air pollution sources along with the amount of pollution emitted from each source or category over a given time period. Emissions inventories represent estimates of the air pollution emissions from given sources; they are not measurements of ambient concentrations. Emissions inventory data is used as the primary input for air quality modeling, used for developing control strategies, and provide a means to track progress in meeting emissions reduction commitments. More specifically, the inventories in this appendix are used to evaluate and propose control measures, to track emissions for Rate of Progress (ROP), to track Emissions Reduction Credits (ERCs), to establish motor vehicle conformity budgets for transportation planning, and to assist in demonstrating attainment of the national ambient air quality standards (NAAQS).

Pollution sources are grouped by major industry sectors. The following are examples of pollution sources by key sectors:

- Industrial or stationary point sources—power plants and oil refineries;
- Area-wide sources—consumer products and residential fuel combustion;
- On-road sources—passenger vehicles and heavy-duty trucks;
- Off-road mobile sources—aircraft, trains, ships, recreational boats, construction equipment, and farm equipment; and
- Non-anthropogenic (natural) sources—biogenic (or vegetation), geogenic (petroleum seeps), and wildfires.

Tables B-1 and B-2 reflect anthropogenic emissions (i.e., emissions generated by human activity). Only anthropogenic emissions are subject to regulatory requirements. However, biogenic volatile organic compounds emissions (BVOC) from vegetation are evaluated and estimated for photochemical modeling. Total volatile organic compound (VOC) emissions from biogenic sources can overwhelm anthropogenic VOC emissions, particularly during the Valley's ozone season (Table B-3). Appendix F, Modeling Attainment Demonstration and Modeling Protocol, contains a more thorough discussion of BVOCs.

The U.S. Environmental Protection Agency (EPA) establishes requirements pertaining to emissions information that must be included as part of the SIP submittal package. Plans for ozone are to include emissions inventories for oxides of nitrogen (NOx) and VOCs.

As discussed in Chapter 2 and throughout the *2022 Ozone Plan*, the Valley's attainment challenges under the 2015 8-hour ozone standard occur in the summer months. For this reason, this plan focuses on summer (May through October) average daily emissions inventories, with emissions presented as tons per day (tpd).

Emissions inventories are usually developed at various geographical resolutions encompassing district, air basin, and county levels. The inventories presented in this appendix are the total emissions for the San Joaquin Valley Air Basin.

This appendix includes emissions for the San Joaquin Valley Air Basin for the years 2017, and 2022 through 2037. The base year (the year from which the inventory is projected forward and backward) for these inventories is 2017. The year 2022 has been included as a reference point for the current year. 2037 is the latest possible attainment deadline for the federal 2015 8-hour ozone standard.

The tables in this appendix include:

- Table B-1 NO_x Emissions (Summer Daily Averages in Tons per Day)
- Table B-2 VOC Emissions (Summer Daily Averages in Tons per Day)
- Table B-3 Valley-Wide Biogenic Emissions for 2018 in Tons per Day

B.2 EMISSIONS INVENTORY TABLES

Table B-1 NOx Emissions (Summer Daily Averages in Tons per Day)

NOx																		
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																	
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
STATIONARY SOURCES																		
FUEL COMBUSTION																		
ELECTRIC UTILITIES	2.8	2.6	2.4	2.3	2.5	2.5	2.4	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
COGENERATION	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
OIL AND GAS PRODUCTION (COMBUSTION)	2.7	2.2	2.1	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2
PETROLEUM REFINING (COMBUSTION)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MANUFACTURING AND INDUSTRIAL	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
FOOD AND AGRICULTURAL PROCESSING	7.1	5.7	5.5	5.1	4.9	4.7	4.5	4.3	4.1	3.9	3.7	3.7	3.6	3.5	3.5	3.5	3.5	3.4
SERVICE AND COMMERCIAL	4.3	4.3	4.3	3.9	3.8	3.8	3.8	3.7	3.7	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6
OTHER (FUEL COMBUSTION)	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
* TOTAL FUEL COMBUSTION	20.2	17.9	17.4	16.2	16.0	15.7	15.3	14.9	14.7	14.1	13.9	13.8	13.6	13.6	13.5	13.5	13.4	13.4
WASTE DISPOSAL																		
SEWAGE TREATMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LANDFILLS	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL WASTE DISPOSAL	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3

NOx																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
CLEANING AND SURFACE COATINGS																	
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL CLEANING AND SURFACE COATINGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM PRODUCTION AND MARKETING																	
OIL AND GAS PRODUCTION	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PETROLEUM REFINING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM MARKETING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
INDUSTRIAL PROCESSES																	
CHEMICAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
FOOD AND AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINERAL PROCESSES	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
METAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	3.1	3.4	3.4	2.8	2.8	2.8	2.8	2.8	2.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

NOx																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL INDUSTRIAL PROCESSES	3.7	3.9	3.9	3.3	3.4	3.4	3.4	3.4	3.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4
** TOTAL STATIONARY SOURCES	24.5	22.4	21.9	20.0	19.8	19.4	19.0	18.6	18.4	16.8	16.6	16.5	16.4	16.3	16.3	16.2	16.2
AREA-WIDE SOURCES																	
SOLVENT EVAPORATION																	
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL SOLVENT EVAPORATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS PROCESSES																	
RESIDENTIAL FUEL COMBUSTION	3.1	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.4
FARMING OPERATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANAGED BURNING AND DISPOSAL	4.5	4.5	4.4	4.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

NOx																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
COOKING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	7.7	7.4	7.3	6.9	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.8	3.7	3.7	3.6	3.6
** TOTAL AREA-WIDE SOURCES	7.7	7.4	7.3	6.9	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.8	3.7	3.7	3.6	3.6
MOBILE SOURCES																	
ON-ROAD MOTOR VEHICLES																	
LIGHT DUTY PASSENGER (LDA)	6.1	3.4	3.1	2.9	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
LIGHT DUTY TRUCKS - 1 (LDT1)	1.7	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
LIGHT DUTY TRUCKS - 2 (LDT2)	4.6	2.4	2.1	1.9	1.7	1.6	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.9	0.9
MEDIUM DUTY TRUCKS (MDV)	5.4	2.8	2.4	2.1	1.8	1.6	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.7
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	1.1	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	7.3	4.5	4.0	3.6	3.2	2.9	2.5	2.2	2.0	1.7	1.5	1.3	1.1	1.0	0.8	0.7	0.6
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	1.9	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3

NOx																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	12.9	6.4	4.6	4.3	4.0	3.9	3.7	3.6	3.4	3.2	3.1	2.9	2.8	2.6	2.4	2.3	2.2
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	56.1	38.9	29.9	24.5	18.9	17.7	16.2	15.4	14.7	14.2	13.7	13.4	13.0	12.8	12.5	12.4	12.3
MOTORCYCLES (MCY)	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY DUTY GAS URBAN BUSES (UB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SCHOOL BUSES (SB)	1.3	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.3	0.3
OTHER BUSES (OB)	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MOTOR HOMES (MH)	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
* TOTAL ON-ROAD MOTOR VEHICLES	100.6	63.7	51.0	43.7	36.6	34.2	31.5	29.6	28.0	26.7	25.4	24.4	23.4	22.6	21.9	21.3	20.9
OTHER MOBILE SOURCES																	
AIRCRAFT	2.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
TRAINS	13.1	15.0	15.2	15.4	15.5	15.7	15.9	16.1	16.4	16.5	16.6	16.5	16.4	16.0	15.7	14.9	14.0
SHIPS AND COMMERCIAL BOATS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RECREATIONAL BOATS	3.4	3.2	3.2	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
OFF-ROAD RECREATIONAL VEHICLES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OFF-ROAD EQUIPMENT	24.0	18.7	17.6	16.5	15.5	14.5	13.7	12.9	12.2	11.7	11.2	10.7	10.3	10.0	9.8	9.6	9.4
OFF-ROAD EQUIPMENT (PERP)	5.9	3.3	3.2	3.1	2.6	2.5	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1
FARM EQUIPMENT	50.4	35.9	33.6	31.5	29.4	27.3	25.5	23.9	22.4	21.0	19.6	18.4	17.3	16.2	15.2	14.3	13.4
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL OTHER MOBILE SOURCES	99.6	80.9	77.5	74.3	70.8	68.0	65.1	63.0	61.0	59.1	57.3	55.5	53.8	52.1	50.5	48.6	46.6
** TOTAL MOBILE SOURCES	200.2	144.6	128.5	118.1	107.4	102.1	96.6	92.6	89.0	85.8	82.7	79.9	77.3	74.7	72.4	69.9	67.5

NOx																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE (tons/day)																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
GRAND TOTAL FOR SAN JOAQUIN VALLEY	232.4	174.4	157.8	145.0	131.2	125.6	119.6	115.2	111.3	106.5	103.2	100.2	97.4	94.7	92.4	89.8	87.3

Data Source: CARB California Emissions Projection Analysis Model 2019 Ozone SIP v1.04

Table B-2 VOC Emissions (Summer Daily Averages in Tons per Day)

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
STATIONARY SOURCES																	
FUEL COMBUSTION																	
ELECTRIC UTILITIES	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COGENERATION	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
OIL AND GAS PRODUCTION (COMBUSTION)	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6
PETROLEUM REFINING (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANUFACTURING AND INDUSTRIAL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
FOOD AND AGRICULTURAL PROCESSING	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
SERVICE AND COMMERCIAL	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6
OTHER (FUEL COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL FUEL COMBUSTION	3.4	3.1	3.1	3.0	2.9	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
WASTE DISPOSAL																	
SEWAGE TREATMENT	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LANDFILLS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER (WASTE DISPOSAL)	21.5	21.7	22.1	22.4	22.7	23.0	23.3	23.5	23.8	24.2	24.6	24.9	25.3	25.7	26.1	26.5	26.9
* TOTAL WASTE DISPOSAL	23.2	23.4	23.8	24.2	24.5	24.8	25.0	25.3	25.6	26.0	26.4	26.8	27.2	27.6	28.0	28.4	28.9
CLEANING AND SURFACE COATINGS																	
LAUNDERING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
DEGREASING	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3
COATINGS AND RELATED PROCESS SOLVENTS	8.8	9.5	9.7	10.0	10.1	10.1	10.2	10.3	10.4	10.5	10.6	10.8	11.0	11.2	11.4	11.7	11.9
PRINTING	5.6	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.4	5.4	5.4	5.4	5.5	5.5	5.6	5.6	5.7
ADHESIVES AND SEALANTS	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
OTHER (CLEANING AND SURFACE COATINGS)	7.0	7.5	7.7	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.2	8.2	8.3	8.4	8.5	8.6	8.8
* TOTAL CLEANING AND SURFACE COATINGS	24.0	24.9	25.2	26.0	26.1	26.2	26.3	26.4	26.5	26.7	27.0	27.3	27.6	28.0	28.4	28.9	29.4
PETROLEUM PRODUCTION AND MARKETING																	
OIL AND GAS PRODUCTION	11.5	9.9	9.6	9.3	9.0	8.7	8.5	8.2	8.0	7.8	7.5	7.3	7.1	6.9	6.7	6.5	6.3
PETROLEUM REFINING	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PETROLEUM MARKETING	5.1	4.4	4.3	4.2	4.1	4.0	4.0	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	17.0	14.8	14.4	13.9	13.6	13.2	12.9	12.6	12.3	12.1	11.8	11.6	11.3	11.1	10.9	10.7	10.6
INDUSTRIAL PROCESSES																	
CHEMICAL	2.6	2.5	2.5	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.9	2.9	3.0	3.0	3.1
FOOD AND AGRICULTURE	12.8	13.0	13.1	13.4	13.7	13.9	14.1	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.8	17.1

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
MINERAL PROCESSES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
METAL PROCESSES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
* TOTAL INDUSTRIAL PROCESSES	16.3	16.4	16.5	16.9	17.2	17.5	17.7	17.9	18.3	18.6	18.9	19.3	19.7	20.1	20.5	20.9	21.3
** TOTAL STATIONARY SOURCES	83.9	82.6	83.0	83.9	84.4	84.6	84.8	85.0	85.6	86.1	86.9	87.7	88.5	89.4	90.5	91.6	92.9
AREA-WIDE SOURCES																	
SOLVENT EVAPORATION																	
CONSUMER PRODUCTS	25.8	27.2	27.4	28.0	28.4	28.7	29.0	29.5	29.8	30.4	30.9	31.4	31.8	32.2	32.7	33.1	33.6
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	6.7	7.0	7.1	7.1	7.2	7.3	7.4	7.4	7.5	7.6	7.7	7.8	7.8	7.9	7.9	8.0	8.1
PESTICIDES/FERTILIZERS	17.0	15.8	15.8	15.7	15.7	15.6	15.6	15.5	15.5	15.5	15.4	15.4	15.3	15.3	15.3	15.2	15.2
ASPHALT PAVING / ROOFING	1.0	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4
* TOTAL SOLVENT EVAPORATION	50.6	51.2	51.5	52.0	52.5	52.8	53.2	53.8	54.2	54.8	55.3	55.8	56.3	56.8	57.3	57.8	58.3
MISCELLANEOUS PROCESSES																	
RESIDENTIAL FUEL COMBUSTION	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
FARMING OPERATIONS	93.8	93.6	93.5	93.5	93.5	93.5	93.4	93.4	93.4	93.4	93.4	93.4	93.3	93.3	93.3	93.3	93.3
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MANAGED BURNING AND DISPOSAL	9.3	10.5	10.5	9.8	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3
COOKING	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	104.2	105.2	105.2	104.5	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0	100.9	100.9	100.9
** TOTAL AREA-WIDE SOURCES	154.8	156.4	156.7	156.5	153.5	153.8	154.2	154.8	155.2	155.7	156.3	156.8	157.3	157.7	158.2	158.7	159.2
MOBILE SOURCES																	
ON-ROAD MOTOR VEHICLES																	
LIGHT DUTY PASSENGER (LDA)	9.5	6.3	6.0	5.7	5.5	5.3	5.2	5.0	4.9	4.8	4.7	4.5	4.4	4.3	4.2	4.1	4.0
LIGHT DUTY TRUCKS - 1 (LDT1)	3.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.7
LIGHT DUTY TRUCKS - 2 (LDT2)	5.4	4.0	3.8	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.8	2.7	2.6	2.5	2.4	2.3	2.2
MEDIUM DUTY TRUCKS (MDV)	6.1	4.5	4.2	4.0	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.6	2.4	2.3	2.2	2.1
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	1.5	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.3
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	2.9	1.1	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
MOTORCYCLES (MCY)	3.1	3.0	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY DUTY GAS URBAN BUSES (UB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SCHOOL BUSES (SB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER BUSES (OB)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR HOMES (MH)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL ON-ROAD MOTOR VEHICLES	33.9	22.9	21.2	20.2	19.4	18.8	18.1	17.6	17.1	16.6	16.0	15.5	15.0	14.5	14.1	13.7	13.4
OTHER MOBILE SOURCES																	
AIRCRAFT	3.0	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
TRAINS	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5
SHIPS AND COMMERCIAL BOATS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	20.4	16.2	15.5	14.9	14.2	13.6	13.1	12.6	12.1	11.6	11.2	10.8	10.4	10.1	9.7	9.3	8.9
OFF-ROAD RECREATIONAL VEHICLES	2.3	2.0	1.9	1.8	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1	1.0	1.0
OFF-ROAD EQUIPMENT	14.9	14.1	14.0	13.5	12.7	11.7	10.7	9.9	9.1	8.4	7.8	7.4	6.9	6.5	6.2	5.9	5.6
OFF-ROAD EQUIPMENT (PERP)	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
FARM EQUIPMENT	9.0	7.0	6.6	6.3	5.9	5.6	5.3	5.0	4.7	4.5	4.3	4.1	3.9	3.7	3.5	3.4	3.2
FUEL STORAGE AND HANDLING	2.3	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9

VOC																	
SUMMARY CATEGORY NAME	SUMMER AVERAGE tons/day																
	2017	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
* TOTAL OTHER MOBILE SOURCES	53.1	46.3	45.0	43.4	41.5	39.5	37.6	35.8	34.2	32.7	31.4	30.2	29.1	28.1	27.2	26.3	25.5
** TOTAL MOBILE SOURCES	87.0	69.2	66.2	63.6	61.0	58.3	55.7	53.4	51.3	49.3	47.4	45.7	44.1	42.7	41.3	40.0	38.9
GRAND TOTAL FOR SAN JOAQUIN VALLEY	325.7	308.3	305.8	304.0	298.9	296.8	294.7	293.2	292.0	291.2	290.5	290.1	289.9	289.8	290.0	290.4	290.9

Data Source: CARB California Emissions Projection Analysis Model 2019 Ozone SIP v1.04

Table B-3 Valley-Wide Biogenic Emissions for 2018* in Tons per Day

Month	Isoprene	Methylbutenol	Terpenes	Other VOC	Total VOC
January	12.0891	0.0295	4.0875	9.6541	25.8603
February	26.9804	0.0535	6.0739	18.0728	51.1806
March	42.7611	0.07	10.1789	32.5336	85.5437
April	123.7915	0.2224	20.5742	71.1861	215.7743
May	207.4343	0.4044	27.4521	102.807	338.0977
June	405.0661	0.883	46.1957	181.3772	633.522
July	670.6052	1.5091	72.6659	288.0706	1032.8508
August	473.4662	1.0611	53.2267	206.3083	734.0623
September	249.0348	0.5581	30.4927	112.6431	392.7286
October	93.1301	0.1909	14.5391	49.132	156.9922
November	30.9398	0.0694	5.9368	16.9896	53.9355
December	9.0212	0.0193	3.7528	8.175	20.9683

*Valley-wide biogenic emissions for 2017 not available.

B.3 EMISSION STATEMENTS

According to Section 182 (a)(3)(B) of the Clean Air Act (CAA), States with areas designated as nonattainment for ozone must require emission statement data from sources of VOC or NO_x in those areas. This requirement applies to all ozone nonattainment areas regardless of the classification (Marginal, Moderate, etc.). Emission statements should be submitted by November 15, 1993, and annually thereafter. Section 182 (a)(3)(B) (ii) of the CAA allows the State to waive the requirement for emission statements for classes or categories of sources with less than 25 tons per year of actual plant-wide NO_x or VOC emissions if the State provides an inventory of emissions from the class or category based on the use of emission factors established by EPA or other methods acceptable to EPA.

The District adopted Rule 1160 “Emission Statements” on November 18, 1992 that applies to all owners and operators of any stationary source category which emits or may emit nitrogen oxides or reactive organic compounds and submits all information to the state as required by Section 182 (a)(3)(B) of the CAA. The District has been submitting emissions inventory data to the state since 1993 and has continued to do so each year thereafter. Unlike other inventory systems that are static, the District not only submits the required information, but looks to enhance its inventory system each year as new requirements are known or foreseen. This ensures that future information and data requirements are able to be collected, processes are streamlined, and data is managed in an efficient manner.

The District requests annual emissions inventories from all permitted sources in the San Joaquin Valley. This process starts in January of each year; the District sends (paper or email) each permitted facility an inventory statement or inventory survey form. An emissions inventory statement is required for those facilities that have actual emissions of greater than or equal to 25 tons and an emissions inventory survey form is required

for sources that have potential emissions less than 25 tons. Notably, the 25 ton threshold is not only applied to NO_x and VOC, but some other criteria air pollutants as well. The District processes approximately 5,000 facilities annually. This data is submitted to CARB by August of each year.

B.4 EMISSIONS INVENTORY DOCUMENTATION FOR THE SAN JOAQUIN VALLEY 2022 70 PPB 8-HOUR OZONE STATE IMPLEMENTATION PLAN

[This section provided by California Air Resources Board]

B.4.1 Emissions Inventory Background

Emissions inventories are required by the Clean Air Act (CAA) and the Ozone SIP Requirements Rule for the 2015 ozone National Ambient Air Quality Standards (NAAQS), also called the Ozone Implementation Rule.¹ Specifically, they are required for those areas that exceed the health-based NAAQS. These areas are designated as nonattainment based on monitored exceedances of these standards. These nonattainment areas must develop an emissions inventory as the basis of a State Implementation Plan (SIP) that demonstrates how they will attain the standards by specified dates. This document describes the emissions inventory included in the San Joaquin Valley (SVJ) 70 ppb Ozone SIP.

B.4.2 Emissions Inventory Overview

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by facilities, mobile sources, and areawide sources. 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.

The California Air Resources Board (CARB) and the San Joaquin Valley Unified Air Pollution Control District (District) have developed a comprehensive current emissions inventory consistent with the requirements set forth in Section 182(a)-(f) of the federal Clean Air Act.²

CARB and District staff conducted a thorough review of the inventory to ensure that the emission estimates reflect accurate emissions reports for point sources and that estimates for mobile and areawide sources are based on the most recent approved models and methodologies.

¹ Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; (40 CFR part 51 Subpart AA; see also <https://www.epa.gov/ground-level-ozone-pollution/implementation-2008-national-ambient-air-quality-standards-naaqs-ozone>).

² Section 182(a)-(f) of the Act. <https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapl-partD-subpart2-sec7511a.htm>

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.

The United States Environmental Protection Agency (U.S. EPA) regulations require that the emissions inventory for an Ozone SIP contain emissions data for the two precursors to ozone formation: oxides of nitrogen (NO_x) and volatile organic compounds (VOC)³. 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.4.2.1 Inventory Base Year

40 CFR 51.1315(a) requires that the inventory year be selected consistent with the baseline year for the reasonable further progress (RFP) plan as required by 40 CFR 51.1310(b)⁴, which states that the base year emissions inventory shall be the emissions inventory for the most recent calendar year of which a complete triennial inventory is required to be submitted to EPA under the provisions of subpart A of 40 CFR part 51, Air Emissions Reporting Requirements, 40 CFR 51.1– 50. States may also use an alternative baseline emissions inventory provided that the year selected corresponds with the year of the effective date of designation as nonattainment for that NAAQS⁵.

CARB selected the base year 2017 because it is the most recent triennial inventory year conducted for the National Emissions Inventory (NEI) pursuant to the Air Emissions Reporting Requirements (AERR) rule.

B.4.2.2 Forecasted Inventories

In addition to base year emissions, emissions projections are needed for a variety of reasons, including redesignation maintenance plans, the attainment projected inventory for a nonattainment area (NAA), and air quality modeling for attainment plans⁶. For stationary and area sources, forecasted inventories are a projection of the base year inventory that reflects expected growth trends for each source category and emissions reductions due to adopted control measures. CARB develops emission forecasts by applying growth and control profiles to the base year inventory. The stationary and area source emissions inventory for the SJV 70 ppb Ozone SIP is

³ Section 182(a)(1) of the Act. <https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapl-partD-subpart2-sec7511a.htm>

⁴ 40 CFR 51.1315(a). <https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf>.

⁵ 40 CFR 51.1310(b). <https://www.govinfo.gov/content/pkg/CFR-2020-title40-vol2/pdf/CFR-2020-title40-vol2-sec51-1310.pdf>.

⁶ 40 CFR 51.114. <https://www.govinfo.gov/content/pkg/CFR-2000-title40-vol2/pdf/CFR-2000-title40-vol2-sec51-114.pdf>.

modeled by the California Emission Projection Analysis Model (CEPAM), 2019 Emission Projections, Version 1.04.

Growth profiles for point and areawide sources are derived from surrogates, such as economic activity, fuel usage, population, and housing units, 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 on-road mobile source emissions are generated by CARB's EMFAC2017 model, which predicts activity rates and vehicle fleet turnover by vehicle model year, along with activity inputs from the metropolitan planning organization (MPO). Off-road mobile sources are forecasted with category-specific model or, where not available, CARB's OFFROAD2007. CEPAM integrates the emission projections derived from these mobile source models to develop a comprehensive forecasted emission inventory. As with stationary sources, the mobile source models include control algorithms that account for adopted regulatory actions.

B.4.2.3 Temporal Resolution

40 CFR 51.1315(c) requires emissions values included in the base year inventory to be actual ozone season day emissions as defined by 40 CFR 51.1300(q)⁷. Since ozone concentrations tend to be highest during the summer months, the emissions inventory used in the SIP is based on the summer season (May through October).

B.4.2.4 Quality Assurance and Quality Control

CARB has established a quality assurance and quality control (QA/QC) process to ensure the integrity and accuracy of the emission inventories used in the development of air quality plans. 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 air districts, which 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. Area-wide source emissions estimates are developed by both CARB and District staff, and the methodologies are reviewed by both agencies before their inclusion in the emissions inventory. Mobile categories are verified with CARB mobile source staff for consistency with the on-road and off-road emission models. Additionally, CEIDARS is designed with automatic system checks to prevent errors, such as double counting of emission sources. At the final stage, CEPAM is thoroughly reviewed to validate the accuracy of

⁷ 40 CFR 51.1315(c). <https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf>.

growth and control application, and the output emissions are compared against prior approved versions of CEPAM to identify data anomalies.

B.4.3 Emission Inventory Components

A summary of the components that make up SJV's 70 ppb Ozone SIP emissions inventory is presented in the following sections. These include mobile (on- and off-road) sources, stationary point sources, and areawide sources. Natural sources are not included.

B.4.3.1 Mobile Source Emissions

CARB develops the emission inventory for the mobile sources using various modeling methods. These models account for the effects of various adopted regulations, technology types, fleet turnover, and seasonal conditions on emissions. Mobile sources in the emission inventory are composed of both on-road and off-road sources, described in the sections below.

On-Road Mobile Source Emissions

Emissions from on-road mobile sources, which include passenger vehicles, buses, and trucks, were estimated using outputs from CARB's EMFAC2017 model. The on-road emissions were calculated by applying EMFAC2017 emission factors to the transportation activity data provided by the local MPO.

EMFAC2017 includes data on California's car and truck fleets and travel activity. Light-duty motor vehicle fleet age, vehicle type, and vehicle population were updated based on 2016 DMV data. The model also reflects the emissions benefits of CARB's recent rulemakings such as the Pavley Standards and Advanced Clean Cars Program and includes the emissions benefits of CARB's Truck and Bus Rule and previously adopted rules for other on-road diesel fleets.

EMFAC2017 utilizes a socio-econometric regression modeling approach to forecast new vehicle sales and to estimate future fleet mix. Light-duty passenger vehicle population includes 2016 DMV registration data along with updates to mileage accrual using Smog Check data. Updates to heavy-duty trucks include model year specific emission factors based on new test data, and population estimates using DMV data for in-state trucks and International Registration Plan (IRP) data for out-of-state trucks.

Additional information and documentation on the EMFAC2017 model is available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation>

EMFAC2017 SAFE Vehicles Rules Off-Model Adjustment Removal

On September 27, 2019, U.S. EPA and National Highway Traffic Safety Administration (NHTSA) published the “Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program” (SAFE-1).⁸ SAFE-1 revoked California’s authority to set its own greenhouse gas emissions standards and set zero-emission vehicle mandates in California. On April 28, 2021, U.S. EPA reconsidered the 2019 SAFE-1 by finding that the actions taken as a part of SAFE-1 were decided in error and are now entirely rescinded⁹.

Therefore, any previously applied off-model adjustments as a result of SAFE-1 were removed in this inventory, resulting in a minor reduction in emissions.

EMFAC2017 ACT Off-Model Adjustment

The Advanced Clean Trucks (ACT) regulation was approved on June 25, 2020 and has two main components, a manufacturers zero-emission vehicle (ZEV) sales requirement and a one-time reporting requirement for large entities and fleets. The first component requires manufacturers to sell ZEVs as a percentage of annual truck and bus sales in California for vehicle model years 2024 and newer.

The ACT regulation impacts some of the underlying assumptions in CARB’s EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors in order to reflect the regulation. Adjustment factors were based on calculations in [EMFAC2021](#), which models a percentage of California-certified ZEV sales for each EMFAC category and model year. More information on inventory modelling methods can be found in the ACT Initial Statement of Reasons (ISOR) [Appendix F](#). These adjustment factors were calculated based on emission estimates using [EMFAC2021](#) under two scenarios: (1) controlled scenario -estimated emissions with adopted regulations (EMFAC2021 default) and (2) uncontrolled scenario - estimated emissions without accounting for the benefits of adopted regulations, including ACT and other regulations Heavy-Duty Omnibus, Opacity, and ICT (described below). These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of the ACT regulation. The ACT off-model adjustment factors were only applied to the medium-and heavy-duty truck sectors.

Additional information on ACT is available at:

<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>

Additional information on EMFAC2021 technical details is available at:

https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf

⁸ 84 FR 51310. <https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf>.

⁹ 87 FR 14332. <https://www.govinfo.gov/content/pkg/FR-2022-03-14/pdf/2022-05227.pdf>.

EMFAC2017 Heavy-Duty Omnibus Off-Model Adjustment

On August 27, 2020, CARB adopted the Heavy-Duty (HD) Omnibus regulation, which would establish NOx engine emission standards 90 percent lower than today's technology. The Omnibus Regulation will dramatically reduce NOx emissions by comprehensively overhauling exhaust emission standards, test procedures, and other emissions-related requirements for California-certified heavy-duty engines with engine model years 2024 and newer.

The HD Omnibus regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on [EMFAC2021](#) (described above) in order to reflect the regulation. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of the HD Omnibus regulation. The adjustment factors reflect the impact of all components of the HD Omnibus regulation on in-use (i.e. real-world) NOx emissions and deterioration-related emissions. More details on the inventory analysis for this regulation can be found in [Appendix D](#) of the HD Omnibus staff report.

The HD Omnibus off-model adjustment factors were only applied to on-road heavy-duty vehicles.

Additional information on the HD Omnibus regulation is available at: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>

EMFAC2017 Innovative Clean Transit Off-Model Adjustment

The Innovative Clean Transit (ICT) regulation was adopted by CARB in 2019 and targets reductions in transit fleets by requiring transit agencies to gradually transition their buses to zero-emission technologies. ICT has helped to advance heavy-duty ZEV deployment, with buses acting as a beachhead in the heavy-duty sector. Based on the size of the transit agencies, they are categorized as small and large agencies. Starting calendar year 2023, large agencies follow the phase-in schedule to have a certain percentage of their new purchases as zero emission buses (ZEB). For the small agencies, the start calendar year will be 2025. By 2030, all the agencies need to have 100% of their new purchases as ZEB.

The ICT regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on EMFAC2021 (described above) in order to reflect the regulation. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of ICT. More details on the inventory analysis for this regulation can be found in [Appendix L](#) of the ICT staff

report. The ICT off-model adjustment factors were only applied to the urban buses (UBUS) category.

Additional information on the ICT regulation is available at:

<https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit/ict-regulation>

EMFAC2017 Heavy-Duty Inspection and Maintenance Off-Model Adjustment

Dec. 9th, 2021, California Air Resources Board adopted Heavy-Duty Inspection and Maintenance (HD I/M) program, which controls emissions effectively from non-gasoline on-road heavy-duty vehicles with a gross vehicle weight rating (GVWR) greater than 14,000 pounds. Starting from calendar year 2023, the program drastically reduces NO_x and PM 2.5 emissions by enforcing periodic testing and inspections for heavy-duty trucks operating in California.

The Heavy-Duty Inspection and Maintenance (HD I/M) regulation impacts some of the underlying assumptions in CARB's EMFAC2017 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on off-analysis with EMFAC2021 in order to reflect the regulation. More information on this analysis is provided in [Appendix D](#) of the HD I/M staff report. Since this regulation was adopted after the release of EMFAC2021, these adjustment factors were calculated based on emission estimates under two scenarios: (1) EMFAC2021 with HD I/M analysis incorporated and (2) EMFAC2021 default, which does not include HD I/M. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2017 model by the CEPAM external adjustment module to account for the impact of HD I/M. These off-model adjustment factors were applied to all diesel heavy-duty diesel categories.

Off-Road Mobile Source Emissions

Emissions from off-road sources are estimated using a suite of category-specific models or, where a new model was not available, the OFFROAD2007 model. Many of the newer models are developed to support recent regulations, including in-use off-road equipment, ocean-going vessels, and others. The sections below summarize the updates made by CARB to specific off-road categories.

Recreational Marine Vessels

Pleasure craft or recreational marine vessel (RMV) is a broad category of marine vessel that includes gasoline-powered spark-ignition marine watercraft (SIMW) and diesel-powered marine watercraft. It includes outboards, sterndrives, personal watercraft, jet boats, and sailboats with auxiliary engines. This emissions inventory was last updated in 2014 to support the evaporative control measures. The population, activity, and emission factors were revised using new surveys, DMV registration information, and emissions testing.

Staff used economic data from a 2014 UCLA Economic Forecast to estimate the near-term annual sales of RMV(2014 to 2019). To forecast long-term annual sales (2020 and later), staff used an estimate of California's annual population growth as a surrogate.

Additional information is available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

Recreational Vehicles

Off-highway recreational vehicles include off-highway motorcycles (OHMC), all-terrain vehicles (ATV), off-road sport vehicles, off-road utility vehicles, sand cars, golf carts, and snowmobiles. A new model was developed in 2018 to update emissions from recreational vehicles. Input factors such as population, activity, and emission factors were re-assessed using new surveys, DMV registration information, and emissions testing. OHMC population growth is determined from two factors: incoming population as estimated by future annual sales and the scrapped vehicle population as estimated by the survival rate.

Additional information is available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

Fuel Storage and Handling

Emissions from portable fuel containers (gas cans) were estimated based on past surveys and CARB in-house testing. This inventory uses a composite growth rate that depends on occupied household (or business units), percent of households (or businesses) with gas cans, and average number of gas cans per household (or business) units.

Additional information is available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad>

Small Off-Road Engines (SORE)

Small off-road engines (SORE) are spark-ignition engines rated at or below 19 kilowatts (i.e., 25 horsepower). Typical engines in this category are used in lawn and garden equipment as well as other outdoor power equipment and cover a broad range of equipment. The majority of this equipment belongs to the Lawn & Garden (e.g., lawnmower, leaf blower, trimmer) and Light Commercial (e.g., compressor, pressure washer, generator) categories of CARB's SORE emissions inventory model.

The newly developed, stand-alone SORE2020 Model reflects the recovering California economy from the 2008 economic recession and incorporates emission results from

CARB's recent in-house testing as well as CARB's most recent Certification Database. CARB also has conducted an extensive survey of SORE operating within California through the Social Science Research Center (SSRC) at the California State University, Fullerton (CSUF). Data collected through this survey provides the most up-to-date information regarding the population and activity of SORE equipment in California. The final SORE emissions included the adopted SORE rule in December 2021 as well as the 15-day changes after the Board hearing which allowed the pressure washers (greater than 5 hp) extra time for meeting the regulation. The SORE annual sales were forecasted using historic growth in of the number of California households (DOF household forecasts, 2000 – 2008 and 2009 - 2018).

Additional information on SORE baseline emissions (without the adopted rule and 15-day changes) is available at:

https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020_Technical_Documentation_2020_09_09_Final_Cleaned_ADA.pdf

Ocean Going Vessels

Ocean going vessels (OGVs) were updated in 2021 based on AIS (transponder) data. This data, along with vessel information supplied by South Coast AQMD and IHS Fairplay provides vessel visit counts, speed, engine size, and other vessel characteristics. The inventory adopts US EPA's methodology for emissions based on vessel speed, engine model year and horsepower. The inventory includes transit, maneuvering, anchorage and at-berth emissions, updating the 2019 at-berth-only inventory. The comprehensive national model Freight Analysis Framework (FAF) was used to develop growth rates for forecasting.

Additional information on CARB's general OGV update is available at:

https://ww2.arb.ca.gov/sites/default/files/2022-03/CARB_2021_OGV_Documentation_ADA.pdf

Commercial Harbor Craft

Commercial Harbor Crafts (CHC) are grouped into 18 vessel types: articulated tug barge (ATB), bunker barge, towed petrochemical barge, other barge, dredge, commercial passenger fishing, commercial fishing, crew and supply, catamaran ferry, monohull ferry, short run ferry, excursion, ATB tug, push and tow tug, escort/ship assist tug, pilot boat, research boat, and work boat.

The CHC inventory was updated in 2021 and includes vessels used around harbors such as tug and tow boats, fishing vessels, research vessels, barges, and similar. The inventory was updated based on CARB's reporting data for these vessels, as well as inventories from the Ports of Los Angeles and Long Beach and Oakland and Richmond. This supplied vessel characteristics, and the population was scaled up to match U.S. Coast Guard data on the annual number of vessels in California waters. Activity and load factors were based on a mix of reporting data and port-specific inventories.

Emission factors were based on certification data for harbor craft engines. Population and activity growth factors were estimated based on historical trends in the past decade.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/chc2021/apph.pdf>

Locomotives

All locomotive inventories were updated in 2020 and include linehaul (large national companies), switchers (used in railyards), passenger, and Class 3 locomotives (smaller regional companies). Data for each sector was supplied by rail operations, including Union Pacific and Burlington Northern, and Santa Fe Railway (BNSF) for linehaul and switcher operations. Data for other categories was supplied by the locomotive owners. Emission factors for all categories were based on U.S. EPA emission factors for locomotives. The inventory reflects the 2005 memorandum of understanding (MOU) with Union Pacific and BNSF. Growth rates were primarily developed from the FAF.

More information is available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

Military and Industry Locomotives

This new category includes military and Industrial (M&I) locomotive emission inventory and relies on the annual fuel consumption and engine information collected from 2011 to 2018. The M&I locomotive data was supplied by 39 private companies, 4 military rail groups, with a total of 85 locomotives. The subject locomotives typically consist of smaller, older switchers and medium horsepower (MHP, 2,301 to 3,999 hp) locomotives operating within the boundaries of a granary, plant, or industrial facility.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

Diesel Agricultural Equipment

The agricultural equipment inventory covers all off-road vehicles used on farms or first processing facilities (of all fuel types). It was updated in 2021 using a 2019 survey of California farmers and rental facilities, and the 2017 U.S. Department of Agriculture (USDA) agricultural census. Emission factors are based on the 2017 off-road diesel emission factor update. The inventory reflects incentive programs for agricultural equipment that were implemented earlier than August 2019. Agricultural growth rates were developed using historical data from the County Agricultural Commissioners' reports.

Additional information is available at:

https://ww2.arb.ca.gov/sites/default/files/2021-08/AG2021_Technical_Documentation_0.pdf

In-Use Off-Road Equipment

This category covers off-road diesel vehicles over 25 horsepower in construction, mining, industrial, and oiling drilling categories. The inventory was updated in 2022 based on the DOORS registration program. Activity was updated based on a 2021 survey of registered equipment owners, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the In-Use Off-Road Equipment Regulations, as amended in 2011.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

Cargo Handling Equipment

The Cargo Handling Equipment (CHE) inventory covers equipment (of all fuels) used at California ports and intermodal railyards, such as cranes, forklifts, container handling equipment, and more. The inventory population and activity were updated in 2021 based on the port inventories for the Ports of Los Angeles and Long Beach and Richmond, and the CARB reporting data for other ports and railyards, which had a more comprehensive inventory than available through reporting. Load factors were based on the previous inventory in 2007, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the CHE Airborne Toxic Control Measures (ATCM), adopted in 2005 and completed in 2017.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

Transportation Refrigeration Units

The Transportation Refrigeration Units (TRU) inventory was updated in 2020 based on the TRU reporting program at CARB. The activity was developed based on 2010 surveys of facilities served by TRUs and 2017 to 2019 telematics data purchased from TRU manufacturers. Emission factors were developed specifically for TRUs based on TRU engine certification data reported to U.S. EPA as of 2018. The inventory reflects the TRU ATCM and 2021 amendments. Forecasting was based on IBISWorld reports forecast for related industries, and turnover forecasting was based on the past 20 years equipment population trends.

Additional information is available at:

<https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/apph.pdf>

Portable Equipment

Portable equipment inventory includes non-mobile diesel, such as generators, pumps, air compressors, chippers, and other miscellaneous equipment over 50 horsepower. This inventory was developed in 2017 based on CARB's registration program, 2017 survey of registered owners for activity and fuel, and the 2017 off-road diesel emission factor update. The inventory also reflects the Portable ATCM and 2017 amendments. Because registration in PERP is voluntary, the PERP registration data was used as the basis for equipment population, with an adjustment factor used to represent the remaining portable equipment in the state. Estimates of future emissions beyond the base year were made by adjusting base year estimates for population growth, activity growth, and the purchases of new equipment (i.e. natural and accelerated turnover).

Additional information is available at:

<https://ww3.arb.ca.gov/msei/ordiesel/perp2017report.pdf>

Large Spark Ignition/Forklifts

The large spark ignition (LSI) inventory includes gasoline and propane forklifts, sweeper/scrubbers, and tow tractors. The inventory was updated in 2020 based on the LSI/forklift registration in the DOORS reporting system at CARB, and the sales data was provided by the Industrial Truck Association (ITA). Activity was based on a survey of equipment owners in the DOORS system, and emission factors were based on U.S. EPA's latest guidance for gasoline and propane engines. The inventory reflects the LSI regulation requirements and 2016 amendments.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

<https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

Forestry Equipment

The new 2021 forestry diesel equipment emissions inventory was developed to replace the previous emissions inventory for diesel forestry equipment based on OFFROAD2007. This inventory includes equipment used in forestry and in milling. This includes foresting operations, such as feller/bunchers and dragline operations, equipment used to build roads to reach forested areas, and forklifts or loaders used in milling operations. The inventory was based on a 2019 survey of forestry operations and mills (for calendar year 2017), as well as the 2019 California Department of Tax and Fee Administration data on the annual timber harvest, with emission factors from the 2017 off-road diesel emission factor update. This sector does not include any

emission reduction measures or strategies. The model projects forestry equipment population and emissions in future years by predicting the retirement and purchasing habits of forestry equipment. The model attempts to predict a business as usual (BAU) behavior based on the 2017 survey data.

Additional information is available at:

https://ww2.arb.ca.gov/sites/default/files/2021-10/2021_Forestry_Inventory_Technical_Document_FINAL_09302021.pdf

Stationary Point Sources

The stationary source inventory is composed of point sources and area-wide sources. The data elements in the inventory are consistent with the data elements required by the AERR. The inventory reflects actual emissions from industrial point sources reported to the District by the facility operators through calendar year 2017.

More information regarding the District's facility point source inventory is available at:

https://www.valleyair.org/busind/pto/Tox_Resources/emissions_inventory.htm

Stationary point sources also include smaller point sources, such as gasoline dispensing facilities and laundering, that are not inventoried individually, but are estimated as a group and reported as a single source category. Emissions from these sources are estimated using various models and methodologies. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

The District's methodologies are available at:

http://www.valleyair.org/Air_Quality_Plans/EmissionsMethods/EmissionsMethods.htm

Estimates for the categories below were developed by CARB and has been reviewed by CARB staff to reflect the most up-to-date information.

Stationary Nonagricultural Diesel Engines

This category includes emissions from backup and prime generators and pumps, air compressors, and other miscellaneous stationary diesel engines that are widely used throughout the industrial, service, institutional, and commercial sectors. The emission estimates, including emission forecasts, are based on a 2003 CARB methodology derived from the OFFROAD2007 model.

Additional information on this methodology is available at:

<https://ww3.arb.ca.gov/ei/areasrc/arbfuelcombothr.htm>

Agricultural Diesel Irrigation Pumps

This category includes emissions from the operation of diesel-fueled stationary and mobile agricultural irrigation pumps. The emission estimates are based on a 2003 CARB methodology using statewide population and include replacements due to the Carl Moyer Program. Emissions are grown based on projected acreage for irrigated farmland from the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), 2008.

Additional information on this category is available at:

<https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full1-1.pdf>

Wine Fermentation and Aging

This category includes emissions from the fermentation and aging of wine. Wine fermentation volumes in California are reported by the U.S. Alcohol and Tobacco Tax and Trade Bureau. CARB staff derived the emission factors from a computer model developed by Williams and Boulton. Emissions were initially estimated for 2002 and grown to later years using beverage manufacturing (Alcoholic & Non-Alcoholic) economic output.

An emission factor for brandy was derived by Hugh Cook of the Wine Institute. Emissions were initially estimated for 1992 then grown to 2012 using economic output for food manufacturing. Emissions were grown from 2012 to 2017 using beverage manufacturing economic output per Regional Economic Models, Inc. (REMI). Growth for future years is based on REMI forecast version 2.4.5.

Additional information on this methodology is available at:

<http://www.arb.ca.gov/ei/areasrc/arbndprofandag.htm>

Laundering

This category includes emissions from perchloroethylene (perc) dry cleaning establishments. The emission estimates are based on a 2002 CARB methodology that used nationwide perc consumption rates allocated to the county level based on population and an emission factor of 10.125 pounds per gallon used. Emissions were grown based on the California Department of Finance (DOF) population forecasts, 2020.

Additional information on this methodology is available at:

<https://ww3.arb.ca.gov/ei/areasrc/arbcleanlaund.htm>

Degreasing

This category includes emissions from solvents in degreasing operations in the manufacturing and maintenance industries. The emissions estimates are based on a

2000 CARB methodology using survey and industry data, activity factors, emission factors and a user's fraction. Emissions were grown based on CARB/REMI industry-specific economic output, version 2.4.5.

Additional information on this methodology is available at:

<https://ww3.arb.ca.gov/ei/areasrc/arbcleandegreas.htm>

Coatings and Thinners

This category includes emissions from coatings and related process solvents. Auto refinishing emissions estimates are based on a CARB methodology using production data and a composite emission factor derived from a 2002 survey. These estimates were grown based on CARB's on-road mobile sources model (EMFAC2017). Estimates for industrial coatings emissions are based on a 1990 CARB methodology using production and survey data, and emission factors derived from surveys. Estimates for thinning and cleaning solvents are based on a 1991 CARB methodology, census data and a default emission factor developed by CARB. These estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on these methodologies is available at:

<https://ww3.arb.ca.gov/ei/areasrc/arbcleancoatreproc.htm>

Adhesives and Sealants

This category includes emissions from solvent-based and water-based solvents contained in adhesives and sealants. Emissions are estimated based on a 1990 CARB methodology using production data and default emission factors. Estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-cleaning-and-surface-coating-methodologies-adhesives-and-sealants>

Gasoline Dispensing Facilities

This category uses a 2015 CARB methodology to estimate emissions from fuel transfer and storage operations at gasoline dispensing facilities (GDFs). The methodology addresses emissions from underground storage tanks, vapor displacement during vehicle refueling, customer spillage, and hose permeation. The updated methodology uses emission factors developed by CARB staff that reflect more current in-use test data and also accounts for the emission reduction benefits of onboard refueling vapor recovery (ORVR) systems. The emission estimates are based on 2012 statewide gasoline sales data from the California Board of Equalization that were apportioned to the county level using fuel consumption estimates from EMFAC 2014. Emissions were grown based on EMFAC2017.

Additional information on this category is available at:

<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

Gasoline Cargo Tank

This category uses a 2002 CARB methodology to estimate emissions from gasoline cargo tanks. These emissions do not include the emissions from loading and unloading of gasoline cargo tank product; they are included in the gasoline terminal inventory and gasoline service station inventory. Pressure-related fugitive emissions are volatile organic vapors leaking from three points: fittings, valves, and other connecting points in the vapor collection system on a cargo tank. 1997 total gasoline sales were obtained from the California Department of Transportation. The emission factors are derived from the data in the report, "Emissions from Gasoline Cargo Tanks, First Edition," published by the Air and Waste Management Association in 2002.

The initial emission estimates for 1997 were grown to 2012 using a growth parameter developed by Pechan based on gasoline and oil expenditures data. Emissions were grown according to fuel consumption from CARB's EMFAC 2017 mobile sources emission factors model.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

Marine Petroleum Loading

These categories are used to inventory 1987 hydrocarbon emissions associated with loading crude oil, residual oil, gasoline, and jet fuel into marine tankers and gasoline into barges. Emissions result from the displacement of vapors existing in the tank before loading and those generated as new product is loaded.

The amounts of crude oil, gasoline, jet fuel, and residual oil shipped off from California ports were obtained from a United States Army Corps of Engineers report "Waterborne Commerce of the United States, Calendar Year 1986" Part 4.

The emission factor for crude oil loading into tankers was obtained from the report "Hydrocarbon Emissions During Marine Loading of Crude Oils" from Western Oil and Gas Association (1977). The gasoline emission factors for loading into tankers and barges and jet fuel into tankers were obtained from CARB's "Report to the Legislature on Air Pollutant Emissions from Marine Vessels" (1984). The emission factor for residual oil loading into tankers was obtained from the "Inventory of Emissions from Marine Operations within California Coastal Waters, Preliminary Draft" report by Scott Environmental Technology, Inc. (1980). No growth was assumed for these emissions.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

Marine Petroleum Unloading

These categories are used to estimate hydrocarbon emissions associated with lightering crude oil and ballasting marine vessels after unloading crude oil or gasoline.

The amounts of crude oil and gasoline unloaded at California ports were obtained from the United States Army Corps of Engineers report "Waterborne Commerce of the United States, Calendar Year 1986" Part 4.

Crude oil lightering data was obtained from the Bay Area AQMD for 1987. Crude oil and gasoline ballasting data for San Luis Obispo for 1987 was obtained from the Army Corps of Engineers. The volume of water used for ballasting following a cargo discharge was obtained from CARB's "Report to the Legislature on Air Pollutant Emissions from Marine Vessels" (1984).

The crude oil lightering emission factor was obtained from "Hydrocarbon Emissions During Marine Loading of Crude Oils," Western Oil and Gas Association (1977).

Ballasting crude oil and gasoline vessels emission factors were obtained from "Inventory of Emissions from Marine Operations within the California Coastal waters," by Scott Environmental Technology, Inc. (1981). No growth is assumed for this category.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing>

Oil and Gas Production

The oil and natural gas production inventory is estimated by a 2015 CARB methodology. This category is related to fugitive emissions from production-related fuel consumption, fugitive losses (sumps, pits, pumps, compressors, well heads, separators, valves and fittings), vapor recovery and flares, tank and truck working and breathing losses, wastewater treatment, tertiary production, and wet and dry gas stripping. Emissions were calculated using U.S. EPA's Oil and Natural Gas Tool v1.4 with default emissions factors from ENVIRON Int'l Corp's 2012 report, "2011 Oil and Gas Emission Inventory Enhancement Project for CenSARA States," and activity data taken from California's Division of Oil, Gas, and Geothermal Resources (DOGGR) (which was renamed to Geologic Energy Management Division (CalGEM) in 2020). CARB also incorporated data from the 2007 Oil and Gas Industry Survey (e.g., typical component counts) and feedback from individual air districts (e.g., minimum controls required to operate in a certain district, with associated control factors) to improve these

parameters and further adjust the tool's output. Emissions were grown to 2017 based on CalGEM historical statewide production. Growth in future years an assumed 2.9% annual decline, which reflects the statewide CalGEM trend from 2000 through 2016.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/resources/documents/oil-and-gas-industry-survey>

<https://ww3.arb.ca.gov/ei/areasrc/oilandgaseifinalreport.pdf>

Area-Wide Sources

Area-wide sources include categories where emissions take place over a wide geographic area, such as consumer products. Emissions from these sources are estimated using various models and methodologies. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the local districts.

The District's methodologies are available at:

http://www.valleyair.org/Air_Quality_Plans/EmissionsMethods/EmissionsMethods.htm

Estimates for the categories below were developed by CARB and has been reviewed by CARB staff to reflect the most up-to-date information:

Consumer Products and Aerosol Coatings

The Consumer Product emission estimates utilized sales and formulation data from the CARB's mandatory survey of all consumer products sold in California for calendar years 2013 through 2015 (2015 Consumer Product Survey). The aerosol coatings estimates utilized sales and formulation data from a survey conducted by CARB in 2010. Based on the survey data, CARB staff determined the total product sales and total VOC emissions for the various product categories. Growth for personal care products are based on real disposable personal income projections per REMI version 2.4.5. No growth is assumed for aerosol coatings. Growth for all other consumer products are based on DOF population projections, 2020.

Additional information on CARB's consumer products surveys is available at:

<https://ww2.arb.ca.gov/our-work/programs/consumer-products-program/consumer-commercial-product-surveys>

Architectural Coatings

Architectural coatings are coatings applied to stationary structures and their accessories. They include house paints, stains, industrial maintenance coatings, traffic coatings, and many other products. Industrial maintenance coatings are high performance architectural coatings formulated for application to substrates, including floors, exposed to extreme environmental conditions (e.g., immersion in water, chronic

exposure to corrosive agents, frequent exposure to temperatures above 121°C, repeated heavy abrasion). The architectural coatings category reflects emission estimates based on a 2014 comprehensive CARB survey for the 2013 calendar year. The emission estimates include benefits of the 2007 CARB Suggested Control Measures. These emissions are grown based on DOF households forecast, 2020.

Additional information about CARB's architectural coatings program is available at: <https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-architectural-coatings-and-cleaningthinning-solvents>

Pesticides

The California Department of Pesticide Regulation (DPR) develops month-specific emission estimates for agricultural and structural pesticides. Each calendar year, DPR updates the inventory based on the Pesticides Use Report, which provides updated information from 1990 through the 2018 calendar year. Agricultural pesticide emission forecasts for years 2019 and beyond are based on the average of the most recent five years. Growth for agricultural pesticides is based on CARB projections of farmland acres per FMMP, 2016. Growth for structural pesticides is based on DOF households forecast, 2020.

Additional information about CARB's pesticides program is available at: <https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-agricultural-and-non-agricultural-pesticides>

Residential Wood Combustion

Emissions were estimated for 2012 using a 2015 District methodology. The methodology is based on CARB's 2011 methodology, with several refinements based on a 2014 District survey. The inventory reflects the regional distribution and use of wood burning devices, refined fuel usage rates for several types of devices, and emissions reductions from the District's Burn Cleaner Program. The emissions estimates reflect emission factors from U.S. EPA's 2002 National Emission Inventory (NEI). CARB assumes no growth for this category based on the relatively stagnant residential wood fuel use over the past decade (according to the American Community Survey and US Energy Information Administration).

Additional information on CARB's 2011 methodology is available at: <https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

Residential Natural Gas Combustion

CARB staff updated the methodology to reflect 2017 fuel use from the California Energy Consumption Database. The emissions estimates reflect the most recent emissions

factors from U.S. EPA's AP-42 for residential natural gas combustion. Growth is based on California Energy Commission (CEC) projections for natural gas consumption, 2019.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

Residential Distillate Oil and Liquefied Petroleum Gas

The residential distillate oil/liquefied petroleum gas (LPG) category includes emissions occurring in the residential sector. Distillate oil for heating is generally used in older homes and remote areas where natural gas lines are not available.

Activity is based on the number of housing units, population, and LPG and distillate oil capacities. The 1991 Fuels Report Working Paper published by the CEC was used to determine energy demand by fuel type in terms of the number of houses heated by a specific fuel in a particular area. Heating degree days (HDD) are used to estimate how many heating days are likely to occur in a particular area.

This category uses emission factors from U.S. EPA's AP-42. The emissions were initially calculated in 1993 then grown to 2012 using housing unit data from the DOF, 2013. Emissions were grown from 2012 to 2017 using a 'no growth' profile developed by Pechan (2012). Emissions post-2017 were grown based on EIA – SEDS, and no growth was assumed.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion>

Farming Operations

CARB staff updated the non-cattle Livestock Husbandry methodology to reflect livestock population data based on the USDA's 2017 Census of Agriculture. Cattle emissions are primarily based on the 2012 Census of Agriculture. A seasonal adjustment was added to account for the suppression of dust emissions in months in which rainfall occurs. Growth profiles are based on CARB's projections of Census of Agriculture's historical livestock population trends, 2012. No growth is assumed for dairy and feedlots.

Additional information on CARB's methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-farming-operations>

Fires

Emissions from structural and automobile fires were estimated based on a 1999 CARB methodology using the number of fires and the associated emission factors. Estimates for structural fires are calculated using the amount of the structure that is burned, the

amount and content of the material burned, and emission factors derived from test data. Estimates for automobile fires are calculated using the weight of the car and components and composite emission factors derived from AP-42 emission factors. Growth is based on DOF population forecasts, 2020.

Additional information on this methodology is available at:

<https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-fires>

Point and Areawide Source Emissions Forecasting

Emission forecasts (2018 and subsequent years) are based on growth profiles that in many cases incorporate historical trends up to the base year or beyond. The growth surrogates used to forecast the emissions from these categories are presented below in Table B-4. The emissions inventory also reflects emission reductions from point and areawide sources subject to District rules and CARB regulations. The rules and regulations reflected in the inventory are listed below in Table B-5.

Table B-4 Growth Surrogates for Point and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Electric Utilities	Natural Gas	California Energy Commission (CEC) Integrated Energy Policy Report forecast, 2019
	Other Fuels	Energy Information Administration (EIA) Annual Energy Outlook, 2019
Cogeneration	All	CEC forecast, 2019
Oil and Gas Production (Combustion)	All	DOGGR statewide total oil production. Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining (Combustion)	All	No growth assumption
Manufacturing and Industrial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Food and Agricultural Processing	Ag Irrigation I. C. Engines	FMMP irrigated farmland acreage, 2008
	Natural Gas	CEC forecast, 2019
	Others	REMI economic forecast, version 2.4.5; EIA forecast, 2018
Service and Commercial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Other (Fuel Combustion)	Diesel	Modeled estimate, 2003
	Other than diesel	EIA forecast, 2018
Waste Disposal	All	DOF population forecast, 2020
Laundering	Dry Cleaning	DOF population forecast, 2020

Source Category	Subcategory	Growth Surrogate
Degreasing	All	CARB/REMI economic forecast, version 2.4.5
Coatings & Thinners	Auto Refinishing	Vehicles from CARB EMFAC2017 model
	Others	REMI economic forecast, version 2.4.5
Printing	All	REMI economic forecast, version 2.4.5
Adhesives & Sealants	All	REMI economic forecast, version 2.4.5
Oil and Gas Production	All	Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining	All	No growth assumption
Petroleum Marketing	Natural Gas Transmission	CEC forecast, 2019
	Gas Dispensing Facilities and Cargo Tanks	Fuel use from CARB EMFAC2017 model
	Other Point Sources	REMI economic forecast, version 2.4.5
Chemical	All	REMI economic forecast, version 2.4.5
Food & Agriculture	All	REMI economic forecast, version 2.4.5
Mineral Processes	All	REMI version 2.4.5; EIA forecast, 2018
Metal Processes	All	REMI economic forecast, version 2.4.5
Glass and Related Products	Container Glass, Other Glass	No growth assumption
	Flat Glass	Modeled estimate, 2012
Other Industrial Processes	All	REMI economic forecast, version 2.4.5
Consumer Products	Personal Care Products	Real Disposable Personal Income per REMI, version 2.4.5
	Other Consumer Products	DOF population forecast, 2020
	Aerosol Coatings	No growth
Architectural Coatings & Related Process Solvents	All	DOF households forecast, 2020
Pesticides & Fertilizers	Agricultural Pesticides	CARB projection of farmland acres per FMMP, 2016

Source Category	Subcategory	Growth Surrogate
	Structural Pesticides	DOF households forecast, 2020
Asphalt Paving & Roofing	All	DOF construction jobs forecast, 2020; CARB projection
Residential Fuel Combustion	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA – SEDS, No growth
Farming Operations	Dairy / Feedlots	No growth
	Other Livestock	CARB projection of livestock population per Census of Agriculture, 2012
Fires	All	DOF population forecast, 2020
Managed Burning and Disposal	Agricultural Burning, Prunings & Field Crops	FMMP farmland acreage projection, 2016
	Non-Agricultural Open Burning	Rural counties: DOF population forecast, 2020. Urban counties: no growth.
	Unspecified Waste Burning	DOF population forecast, 2020
	Others	No growth
Cooking	All	DOF population forecast, 2020

Table B-5 District and CARB Control Rules and Regulations Included in the Inventory

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4103	Open Burning	Agricultural burning
SJU_APCD	4305	Boilers, Process Heaters, and Steam Generators - Phase 2	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4306	Boilers, Process Heaters, and Steam Generators - Phase 3	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4307	Boilers, Process Heaters, and Steam Generators - 2.0 MMBTU/HR to 5.0 MMBTU/HR	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4308	Boilers, Process Heaters, and Steam Generators - 0.075 MMBTU/HR to Less Than 2.0 MMBTU/HR	Fuel combustion / Boilers, Process Heaters, and Steam Generators

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4309	Dryers, Dehydrators, and Ovens	Industrial processes - dryers, dehydrators and ovens
SJU_APCD	4311	Flares	Oil and gas production- Vapor Recovery
SJU_APCD	4351	Boilers, Process Heaters, and Steam Generators - Phase 1	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4352	Solid Fuel Fired Boilers, Steam Generators and Process Heaters	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4354	Glass Melting Furnaces	Glass manufacturing
SJU_APCD	4401	Steam-Enhanced Crude Oil Production Wells	Oil and gas production - vapor recovery
SJU_APCD	4402	Crude Oil Production Sumps	Oil and gas production - fugitive losses
SJU_APCD	4408	Glycol Dehydration Systems	Oil and gas production - dehydrators
SJU_APCD	4409	Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities	Oil and gas production - fugitive losses
SJU_APCD	4455	Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants	Petroleum refining - fugitive losses
SJU_APCD	4565	Biosolids, Animal Manure, and Poultry Litter Operations	Composting operations
SJU_APCD	4566	Organic Material Composting Operations	Composting operations
SJU_APCD	4570	Confined Animal Facilities	Livestock operations
SJU_APCD	4601	Architectural Coatings	Architectural coatings and related process solvents
SJU_APCD	4602	Motor Vehicle and Mobile Equipment Coating Operations	Coatings and related process solvents - auto refinishing
SJU_APCD	4603	Surface Coating of Metal Parts and Products, Plastic Parts and Products, and Pleasure Crafts	Coatings and related process solvents - metal parts and products coatings
SJU_APCD	4604	Can and Coil Coating Operations	Coatings and related process solvents - can and coil coatings
SJU_APCD	4605	Aerospace Assembly and Component Coating Operations	Coatings and related process solvents - aerospace assembly and component coatings

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4606	Wood Coating Operations	Coatings and related process solvents - wood coatings operations
SJU_APCD	4607	Graphic Arts and Paper, Film, Foil and Fabric Coatings	Printing, coatings and related process solvents
SJU_APCD	4610	Glass Coating Operations	Coatings and related process solvents - glass coating operations
SJU_APCD	4612	Automotive Coatings	Coatings and related process solvents - auto refinishing
SJU_APCD	4621	Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants	Petroleum marketing - gasoline transfer
SJU_APCD	4622	Gas Transfer into Vehicle Storage Fuel Tanks	Petroleum marketing - vehicle refueling
SJU_APCD	4623	Storage of Organic Liquids	Petroleum refining; petroleum marketing, oil and gas production - organic liquid storage
SJU_APCD	4624	Organic Liquid Loading	Petroleum marketing - organic liquid loading
SJU_APCD	4625	Wastewater Separators	Petroleum refining - waste water treatment
SJU_APCD	4641	Cutback, Slow Cure, and Emulsified Asphalt Paving and Maintenance Operations	Asphalt paving or roofing
SJU_APCD	4642	Solid Waste Disposal Sites	Landfills; waste disposal
SJU_APCD	4651	Volatile Organic Compound Emissions from Decontaminated Soil	Waste disposal / Soil remediation
SJU_APCD	4653	Adhesives and Sealants	Adhesives & sealants
SJU_APCD	4661	Organic Solvents	Coatings and related process solvents; cleaning and surface coatings
SJU_APCD	4662	Organic Solvent Degreasing Operations	Degreasing
SJU_APCD	4663	Organic Solvent Cleaning, Storage and Disposal	Degreasing; cleaning & surface coating
SJU_APCD	4672	Petroleum Solvent Dry Cleaners	Laundering
SJU_APCD	4681	Rubber Tire Manufacturing	Rubber and rubber products manufacturing
SJU_APCD	4682	Polystyrene, Polyethylene, and Polypropylene Products Manufacturing	Plastic and plastic products manufacturing

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4684	Polyester Resin Operations	Fiberglass and fiberglass products manufacturing
SJU_APCD	4691	Vegetable Oil Processing Operations	Food and agriculture
SJU_APCD	4692	Commercial Charbroiling	Cooking
SJU_APCD	4693	Bakery Ovens	Bakeries
SJU_APCD	4701	Internal Combustion Engines (Phase 1)	Fuel combustion - internal combustion engines
SJU_APCD	4702	Internal Combustion Engines (Phase 2)	Fuel combustion - internal combustion engines
SJU_APCD	4703	Stationary Gas Turbines	Fuel combustion - stationary gas turbines
SJU_APCD	4901	Wood Burning Fireplaces and Wood Burning Heaters	Residential wood combustion
SJU_APCD	4902	Residual Water Heaters	Residential fuel combustion
SJU_APCD	4905	Natural Gas-Fired, Fan-Type Central Furnaces	Service and Commercial / Residential Fuel Combustion - Space Heating
CARB	ARB_R003 & ARB_R003_A	Consumer Product Regulations & Amendments	Consumer products
CARB	ARB_R007	Aerosol Coating Regulations	Aerosol coatings
CARB	GDF_HOSREG	Gasoline Dispensing Facility Hose Emission Regulation	Petroleum marketing - gasoline dispensing facility hoses
CARB	ORVR	Fueling emissions from ORVR vehicles	Petroleum marketing - fueling emissions from ORVR vehicles
CARB	AG_IC_ENG	AG IC Engine Emission Scalars	Agricultural IC Engines
CARB	NONAGICENG	Non-Ag IC Engine Emission Scalars	Non-agricultural IC Engines

External Adjustments

External adjustments were made in CEPAM to account for military growth and other unaccounted regulatory factors. The external adjustments reflected in the CEPAM2019v1.04 inventory are listed below in Table B-6.

Table B-6 External Adjustment IDs and Descriptions

Adjustment ID	Adjustment Description
HD_I/M	Heavy-Duty Inspection and Maintenance (HD I/M) Regulation adopted by CARB Dec 2021
LEMOORE	External adjustments for NAS Lemoore
NonAg_ICE	Non-ag internal combustion engines adjustment to reflect 2003 ATCM and 2010 rule amendment
SJV_Const	SJV Construction and Mining Equipment -- Recession/Recovery Adjustment (period 2011-2019)
TRUCK_REGS	Advanced Clean Trucks (ACT) / Omnibus / Opacity / ICT_UBUS adjustments

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