Chapter 3b: Fugitive Emissions and Source Attribution

The Community Emissions Reduction Plan (CERP) identifies air quality priorities based on community input and from evaluating technical data on emission sources in the community. The CERP defines actions and strategies to reduce the emissions and exposure burden from sources of criteria air pollutants (CAPs) and toxic air contaminants (TACs). To accurately determine emission reductions from these actions and strategies, a baseline emissions profile needs to be established. Baseline emissions can be determined through an emissions inventory that includes accounting of sources and their emissions. Source attribution analysis is the accounting of sources, their emissions and their contribution to the cumulative exposure burden and is required to meet AB 617 statutory requirements. The baseline reference year is 2018.

Chapter 3B Highlights

- Information about the sources of air pollution in this community is presented in a "source attribution" analysis
- Diesel particulate matter (DPM) is currently the main air toxic pollutant in this community, and it comes mostly from on-road and off-road mobile sources
- Other key air toxic pollutants in this community are cadmium and arsenic from construction and demolition, and 1,3-butadiene (from mobile sources and industry)
- In future years, diesel emissions will decrease substantially due to ongoing and newly proposed regulations, but these emissions continue to be the main driver of toxicity in this community

There are many possible approaches to a source attribution analysis. Based on the data that were available for this community, this source attribution analysis emphasizes identifying sources within the community (emissions inventory) and an air quality modeling analysis to identify how much these different sources contribute to air pollution levels in the community. More information on source attribution methods is included in the Source Attribution Methodology report[1]. The most recent air quality modeling analysis was conducted as part of the Multiple Air Toxics Exposure Study (MATES IV) conducted in 2012 and 2013. MATES V is currently underway and will update cancer risk estimation for the Eastern Coachella Valley (ECV) as well as other parts of the South Coast AQMD jurisdiction. Previous special monitoring campaigns also identified sources of odors and hydrogen sulfide and analyzed the contribution of dust from the Salton Sea playa. More information on earlier analyses can be found in the community identification profiles[2]. The detailed methodology used to develop the emissions inventory is provided in the Source Attribution Methodology report[3]. A community-specific emissions inventory was developed

[1] Methodology for Source Attribution Analyses for the first year AB 617 Communities in the South Coast Air Basin (Technical Report), 2019. http://www.aqmd.gov/docs/default-source/ab-617-ab-134/technical-advisory-group/source-attribution-methodology.pdf?sfvrsn=8

[2] Submittal to CARB – AB617 2019 Designated Communities: http://www.aqmd.gov/docs/default-source/ab-617-ab-134/year-2/community-identification-prioritization/final-submittal-year-2.pdf

[3] Methodology for Source Attribution Analyses for the first year AB 617 Communities in the South Coast Air Basin (Technical Report), 2019. http://www.aqmd.gov/docs/default-source/ab-617-ab-134/technical-advisory-group/source-attribution-methodology.pdf?sfvrsn=8

for CAPs, including Nitrogen Oxides (NOx), volatile organic compounds (VOC), and fine particulate matter (PM 2.5), and TACs based on the most recent available datas.

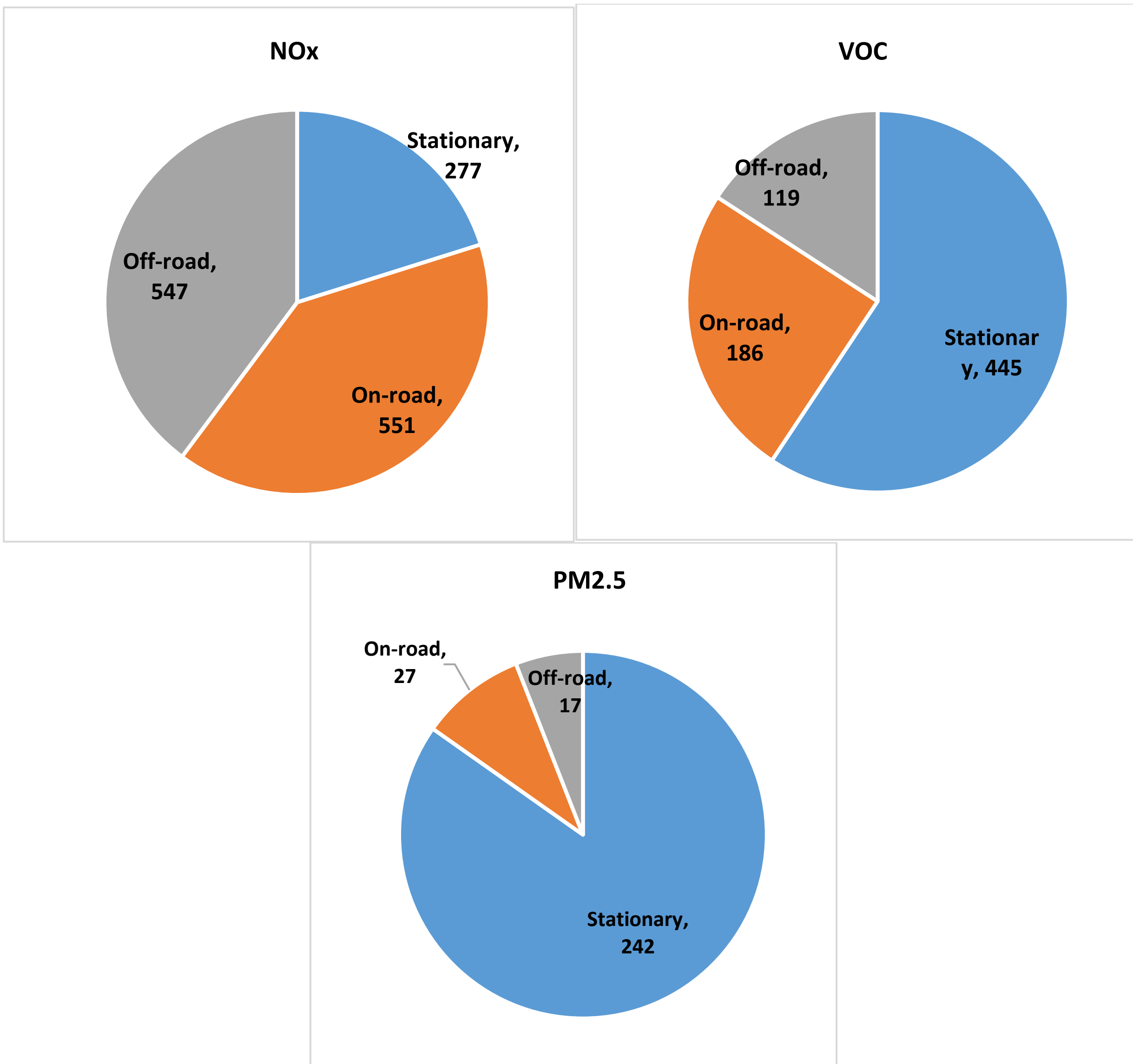
The primary sources of air pollution emissions in the ECV community are on-road vehicles, farming equipment, trains, off-road equipment, and certain industrial activities. This community is also highly impacted by the declining Salton Sea levels, resulting in increasing dust emissions from the Salton Sea playa. Figure 3b-1 shows the primary source categories contributing to CAPs in the ECV community in 2018.

Below is a summary of the CAP emissions in 2018:

- NOx emissions in this community are dominated by mobile sources – both on-road and off-road – which account for more than 80% of the total emissions. Heavy-duty truck traffic, trains, and off-road equipment are the largest sources for NOx. Stationary sources contribute less than 10% of NOx emissions in this community, mostly from fuel combustion in the industrial sectors.
- VOC emissions are dominated by stationary sources, with consumer products being the largest source. Passenger vehicles and off-road equipment, such as lawn mowers and small gasoline engines, are the largest contributors to VOC from on-road and off-road mobile sources, respectively.
- PM2.5 emissions are largely from stationary source emissions, with construction and demolition being the most important source. Other sources include paved and unpaved road dust and farming operations. While paved road dust is also related to vehicles traveling on roads, it is considered as a stationary source rather than a mobile source.

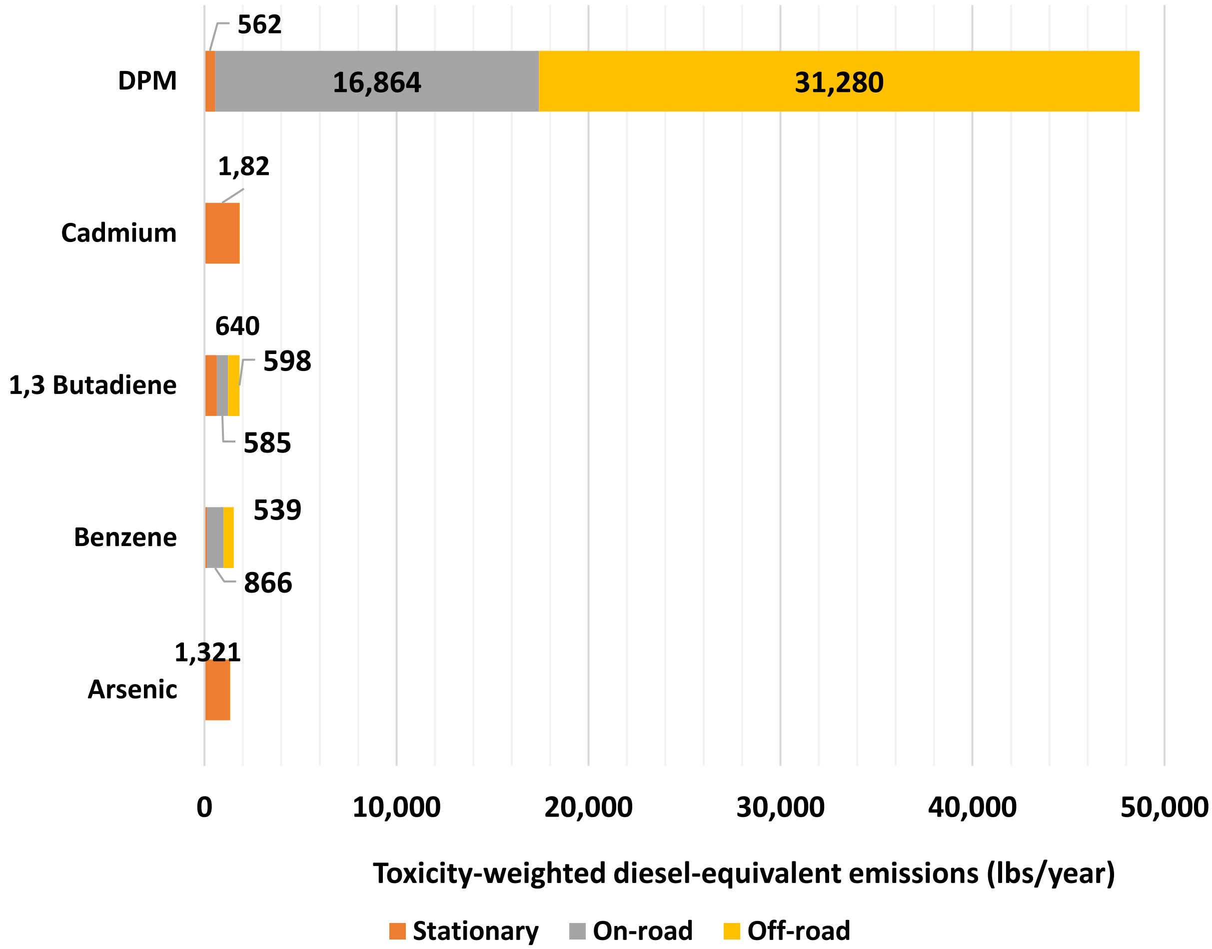
It is important to note that the inventory does not account for some sources of particulate matter such as unpermitted or illegal burning of waste, wildfire emissions, windblown dust from dust storms, or dust blown from the Salton Sea playa. These sources may affect air quality in specific events, but are challenging to quantify due to their inherent uncertainty. Although these emissions are not able to be quantified using available scientific methods, they are important sources of emissions that are being addressed in this CERP.

Figure 3b-1: Primary source categories of NO_X, VOC, and PM2.5 emissions in the ECV community in 2018 (tons/year)



For TACs in the baseline year 2018, DPM is the main air toxic pollutant in this community, with on-road and off-road mobile sources as the predominant sources. The primary contributors of DPM are heavy-duty trucks, trains, farm equipment, and industrial off-road diesel equipment. Stationary sources contribute to the emissions of cadmium and arsenic from the construction and demolition sector, and to emissions of 1,3-butadiene from the chemical industry. Other significant TACs include benzene and formaldehyde from on-road mobile sources. Figure 3b-2 shows TACs in ECV by toxicity-weighted diesel-equivalent emissions in 2018. The emissions are weighted based on the cancer potency of each TAC relative to DPM. For example, cancer potency of arsenic is approximately 11 times higher than that of DPM per unit of mass. Thus, arsenic emissions are multiplied by 11 to estimate the toxicity-weighted emissions of arsenic. This weighting approach shows a comparison of the contribution of each TAC to overall toxicity using a consistent scale.

Figure 3b-2: TAC emissions in the ECV community in 2018 (toxicity-weighted diesel-equivalent, lbs/year)



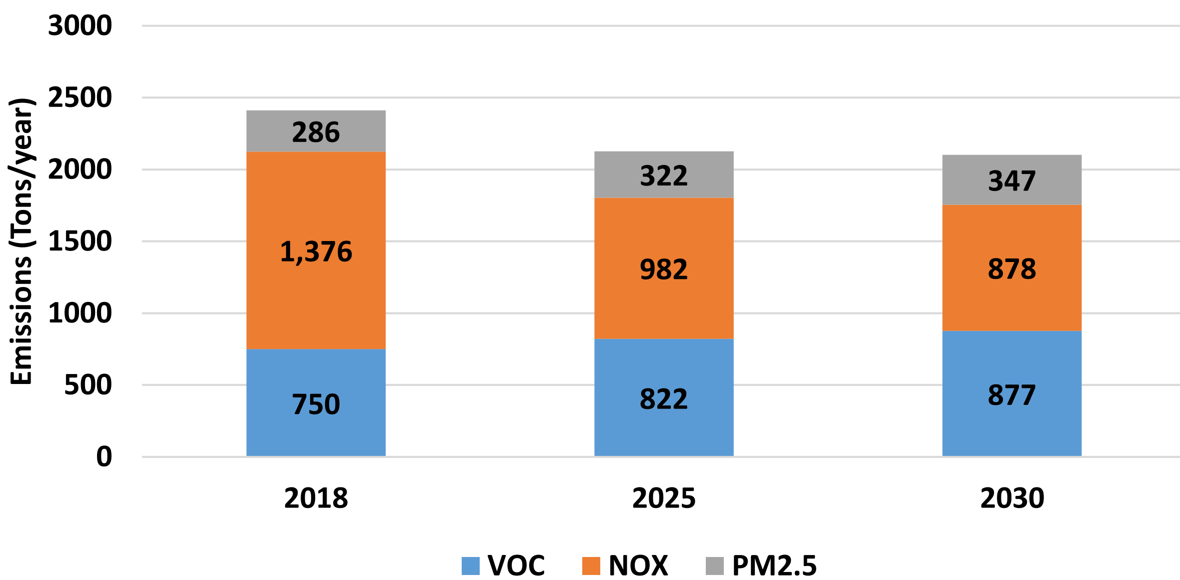
As part of the source attribution analysis, emission trends are determined for two future milestone years. The future milestone years are 2025 and 2030. Future emission trends of CAPs and TACs in the ECV community are projected using the best available information on population growth, economic growth and emission adjustments reflecting the ongoing implementation of existing regulations that reduce specific air pollutants. Regulations reflected in these projections include South Coast AQMD and CARB regulations.

Figure 3b-3 shows the projected CAP emissions (NOx, VOC and PM2.5) in the ECV community in the two future milestone years 2025 and 2030, along with the baseline year 2018. Below is a summary of the CAP emissions between 2018 to 2030:

- NOx emissions in the community are expected to decrease substantially between the year 2018 through 2030, due to the existing regulations on mobile sources, despite the expected increase in industrial and mobile source activities.
- VOC emissions are expected to increase between 2018 and 2030, mostly due to increased consumer product use and industrial activities, including industries in degreasing, coatings, adhesives, and waste disposal.

- PM2.5 emissions are also projected to increase between 2018 and 2030, due to increases in construction and demolition activities.

Figure 3b-3: Emission trends in ECV for NOx, VOC, and PM2.5 (tons/year) for the years 2018, 2025 and 2030



Trends for TAC emissions are shown in Figure 3b-4. DPM continues to dominate the TAC emissions inventory in future years, despite a significant reduction in DPM from heavy-duty trucks and off-road equipment. DPM emissions are projected to decrease by 67% between 2018 and 2030. Emissions of cadmium, arsenic, nickel and lead are projected to increase due to the increase in construction and demolition activities as well as paved road dust. Emissions of 1,3-butadiene are expected to increase due to an increase in industrial activity in the chemical sector and in off-road equipment emissions. Benzene and formaldehyde emissions are projected to decrease from 2018 to 2025 due to decreases in the emissions from vehicles, but they are expected to increase slightly through 2030 due to increasing emissions from industry and off-road equipment. Additional details on the source attribution for ECV can be found in Appendix 3b.

Figure 3b-4: Emission trends in ECV for TACs (toxicity-weighted diesel-equivalent, lbs/year) for the years 2018, 2025 and 2030