Updates on Emissions Inventory and Modeling

Assembly Bill (AB) 617
Community Air Initiatives

Technical Advisory Group Meeting

July 31, 2020

Why do we need these tools?

Based on ARB's Blueprint for Community Emissions Reduction Programs:

Need to identify air pollution challenges facing the community:

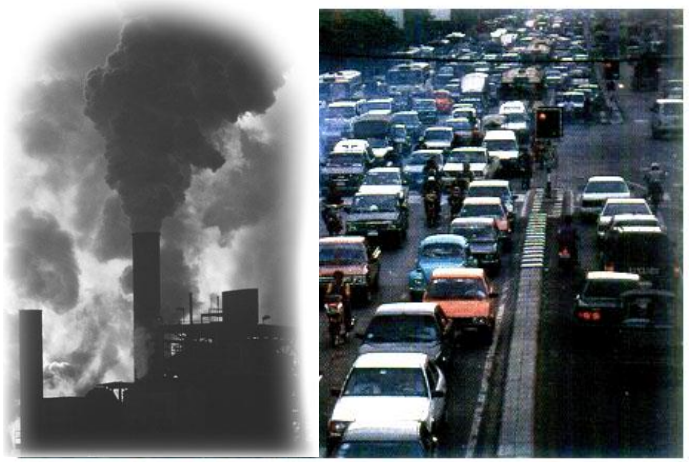
- **Baseline emissions from which emission reductions can be measured (i.e., source attribution analysis)**
- **Sources contributing to cumulative exposure burden**

Develop strategies to reduce emissions and quantify results:

- **Evaluate emission reductions from community strategies**
- **Quantify resulting reduction in exposure burden**

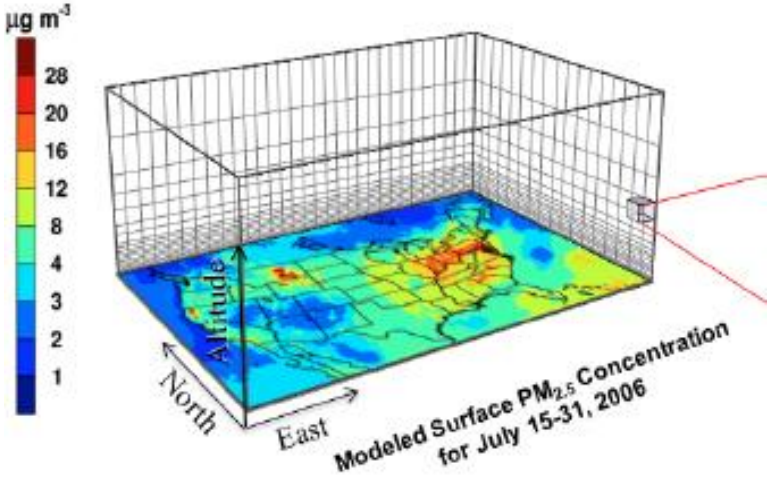
Emissions Inventory and Modeling

Emissions Inventory



Evaluate impact of emission reduction

3-D Air Quality Model

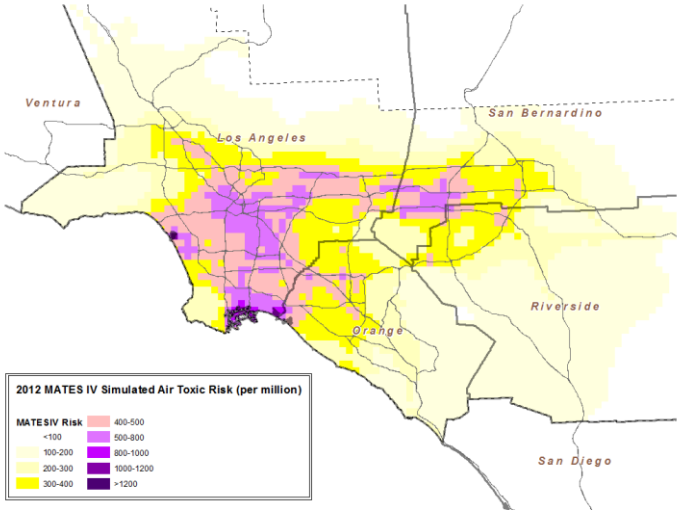


Determine spatial/temporal air quality

Air Quality

Evaluate exposure and health risks

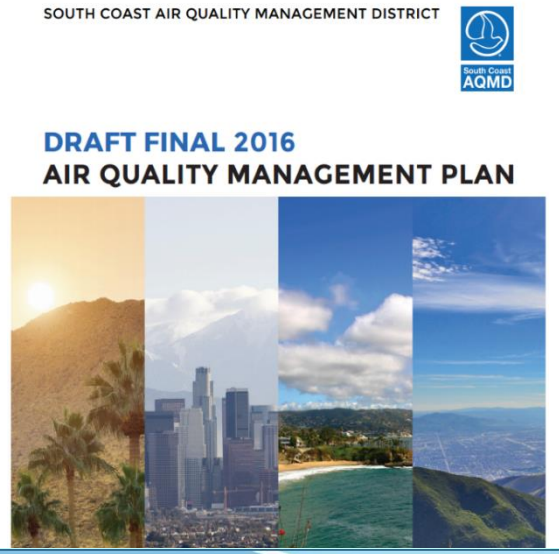
Exposure Risk Assessment

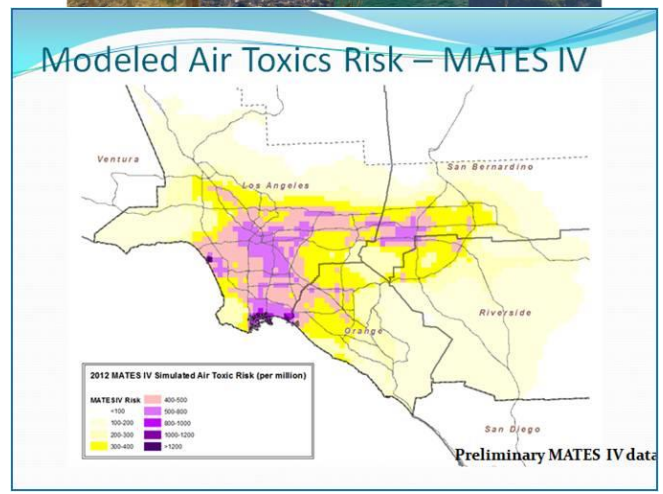


Apply new control strategy

South Coast AQMD's Efforts

- Emissions inventory and modeling used to support the Air Quality Management Plan (AQMP) and the Multiple Air Toxics Exposure Study (MATES)
- Use of state-of-the-art modeling tools
- Use of modeling tools that are peer reviewed in the scientific literature and during the Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group meetings
- Modeling tools are in constant development and improvement





Recent and Upcoming E.I. & Modeling Dataset

- Multiple Air Toxics Exposure Study (MATES) V
  - May 2018 – April 2019
  - 10 fixed location monitoring
    - metals, organic compounds, carbonyls, black carbons, levoglucosan, etc
  - Advanced monitoring
    - Aircraft, Aclima, fluxsense, optical tent
  - Updated emissions inventory, modeling, and air toxics cancer risk estimation
- 2020 SIP revision
  - South Coat Air Basin's Attainment of 2006 24-hour PM2.5 standard
  - Coachella Valley's Attainment of 1997 8-hour ozone standard
- 2022 AQMP to attain federal 2015 8-hour ozone standard by 2037

Data under development

- AB617 2019-designated communities source attribution:
  - 2018, 2025 & 2030
- MATES V
  - Criteria Air Pollutants (CAPs) and Toxic Air compounds (TACs) Emissions Inventory for 2018
  - To be released by spring 2021
- 2022 AQMP
  - Major updates on emissions inventory
  - New activity data, new growth and control factors
  - Emissions projected to 2037
  - New air quality modeling platform with updated versions

Travel Activity Data: 2016 vs 2020 RTP

2016 RTP

TABLE 11 VMT Summary (000s): Continued

Air Basin	L&MD	HD	Total
	2031 BUILD		
SCAB	374,825	31,634	406,459

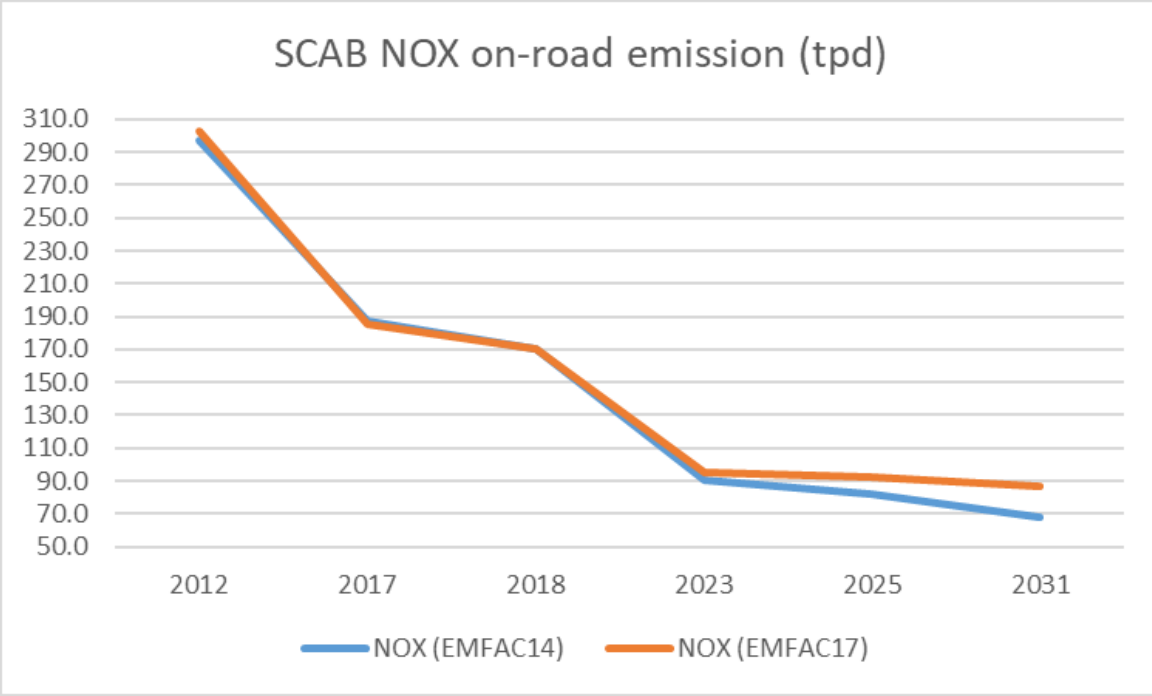
2020 RTP

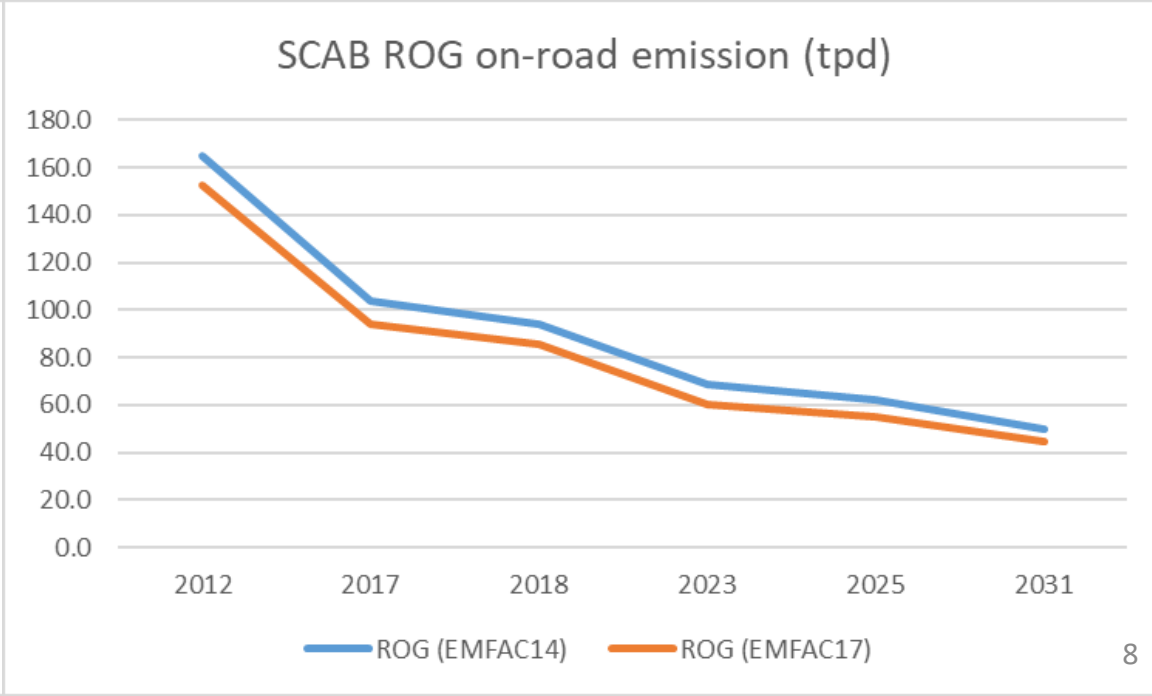
TABLE 10 VMT Summary (in Thousands) – Continued

AIR BASIN	L&MD	HD	TOTAL
	2031 Build		
SCAB	367,751	27,175	394,926

On-road Mobiles Emissions Model: EMFAC

- EMFAC2020 is under development
- The update from EMFAC2014 to EMFAC2017 modifies the estimated on-road emissions.
  - EMFAC17 estimates lower ROG emissions but higher NOx emissions in future years





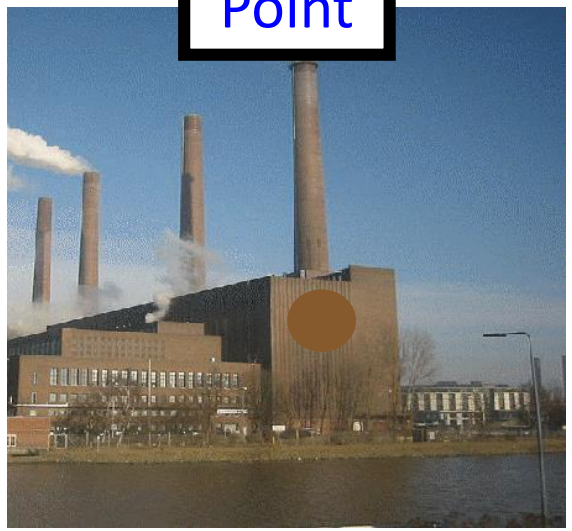
Available Data Set for Source Attribution

- 2016 Air Quality Management Plan (AQMP)
  - CAPs Emissions Inventory
  - Base year 2012
  - Projected to future years: 2017-2031
  - Approved in March 2017: https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp
- MATES IV
  - TACs inventory for 2012
  - Released on May 1, 2015: https://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies/mates-iv
- AB617 Source Attribution Data
  - Methodology report https://www.aqmd.gov/docs/default-source/ab-617-ab-134/technical-advisory-group/source-attribution-methodology.pdf
  - 2018-designated communities: 2017, 2024 & 2029

Methodology to Estimate Criteria and Toxic Air Pollutants Emissions

Emission Source Categories

Point



Area

On-road Mobile

Off-road Mobile

South Coast AQMD

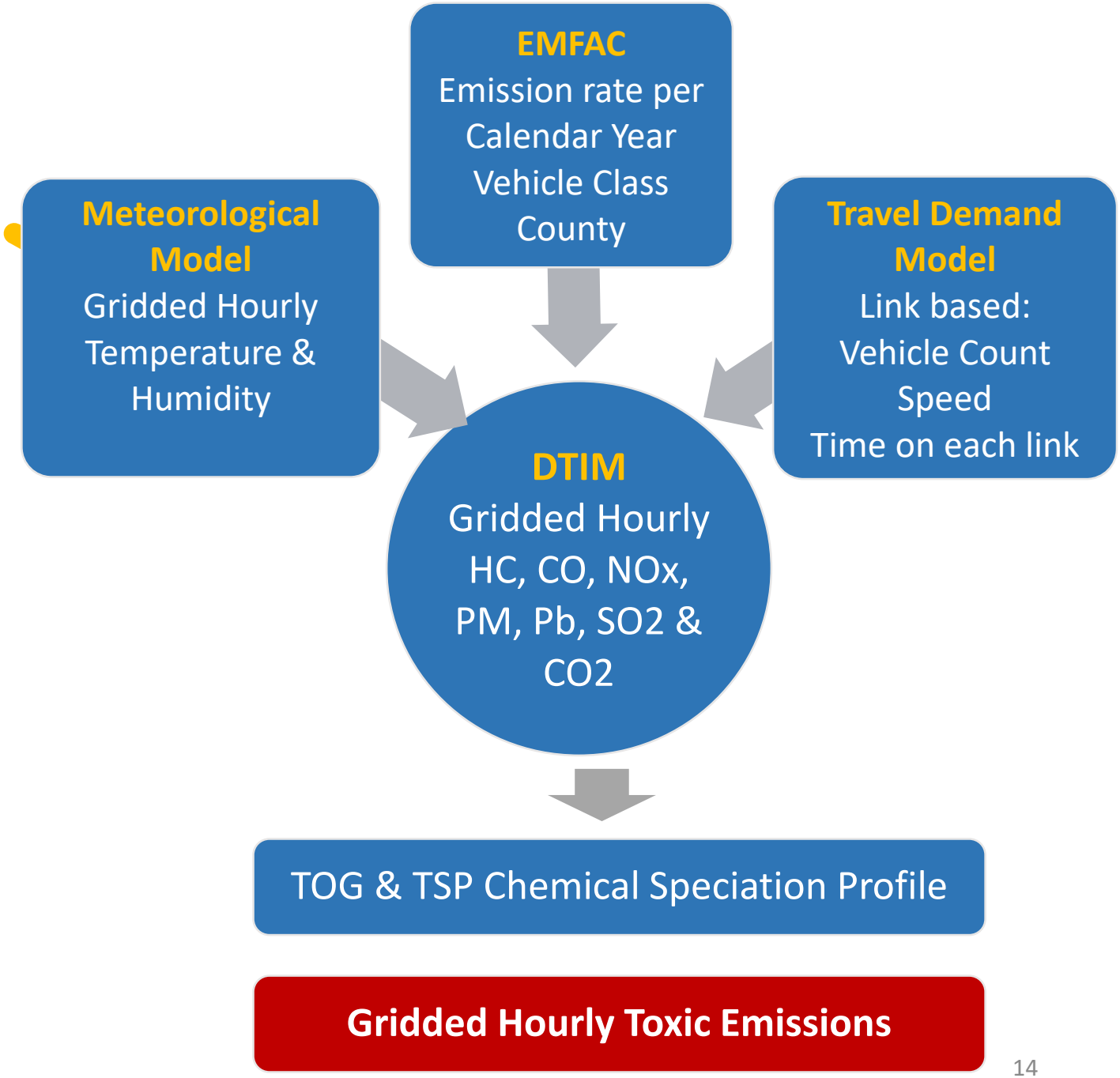
Methodology for Point Source Emissions

- Emissions from Annual Emissions Reporting (AER) Program
  - Approximately 2,000 facilities required to report
- Facilities that emit more than 4 tons/year of VOC, NOx, SOx or PM, or more than 100 tons/year of CO
- Toxic Air Contaminants emissions reported under AB 2588 toxics emission reporting requirements into the AER program (~ 177 toxics compounds)

Methodology for Area Source Emissions

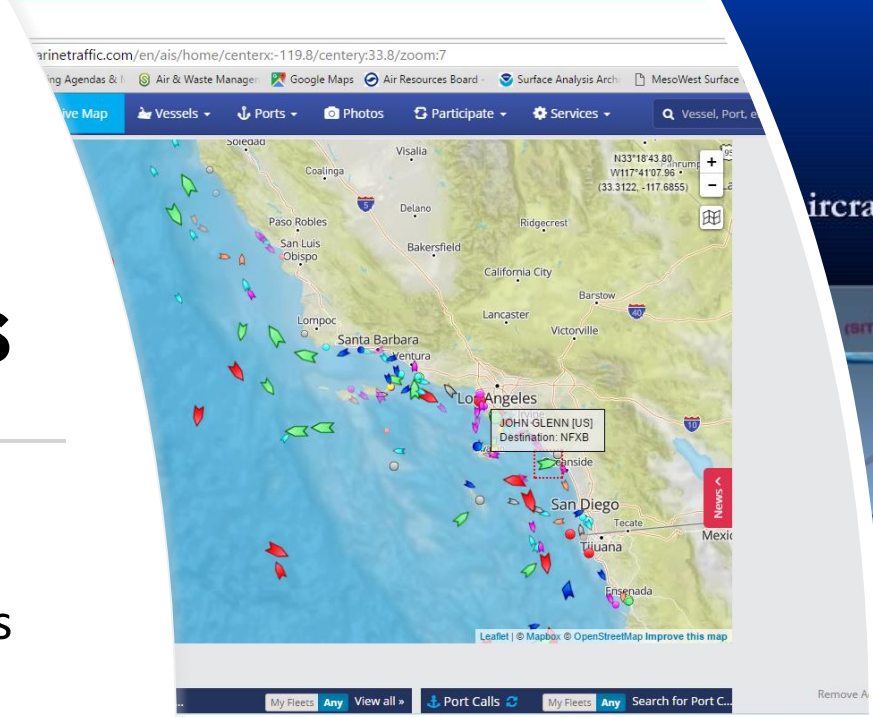
- This sources include consumer products, architectural coatings, degreasing, cooking, residential and commercial fuel combustion, etc.
- Toxic emissions calculated based on CARB speciation profiles for TOG and TSP
- Emissions developed jointly by South Coast AQMD and CARB
- County total emissions are allocated spatially based on various indicators such as population, total employment, housing, land cover types

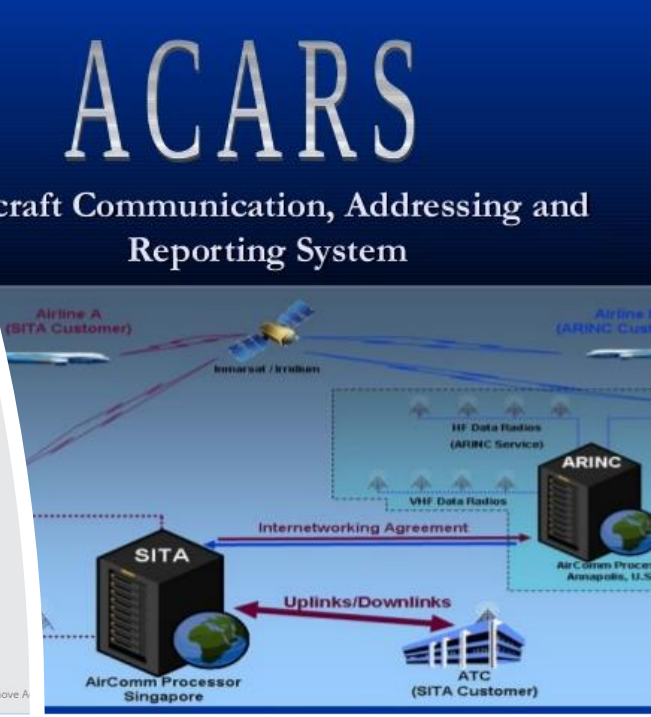
Methodology for On-road Source Emissions

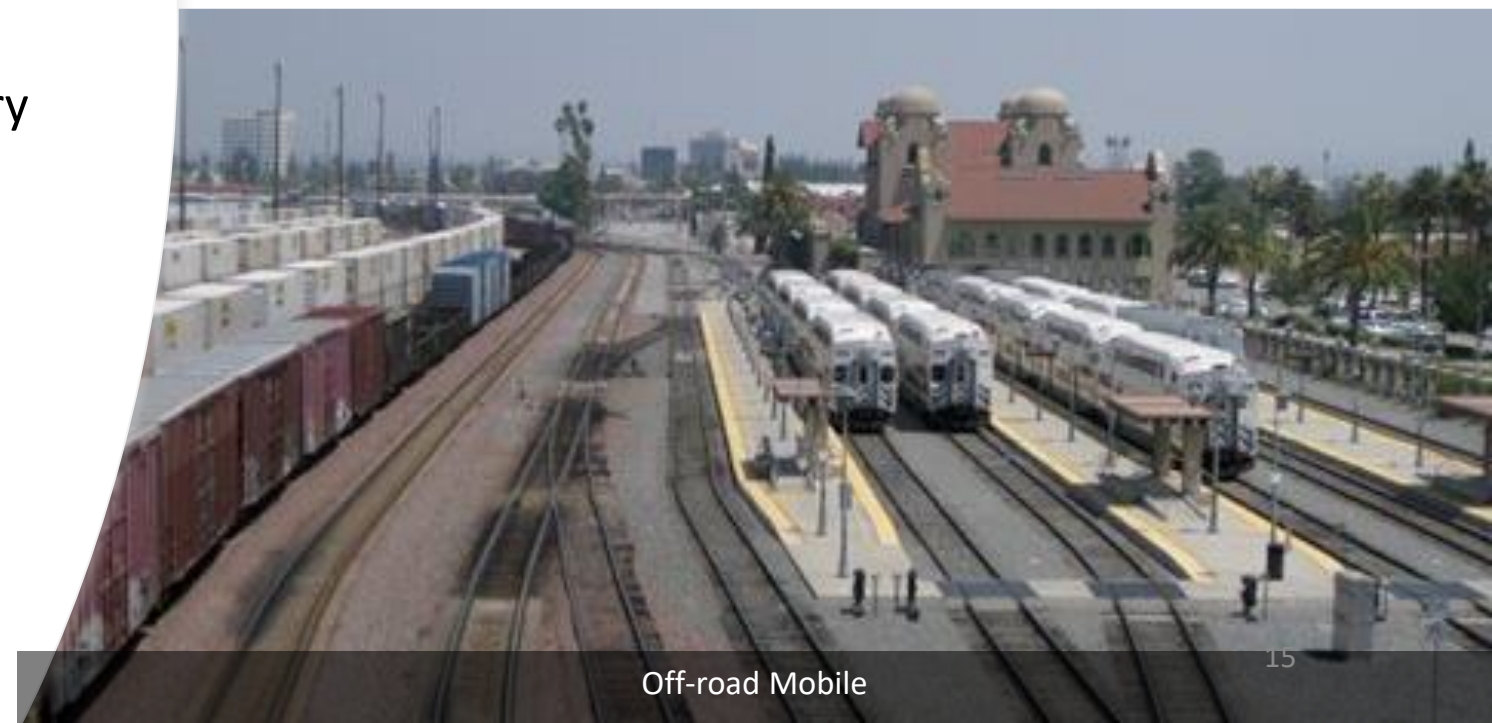


Methodology for Off-road Source Emissions

- This sources include aircraft, ocean going vessels, trains, off-road equipment such as construction, industrial, lawn and garden equipment
- Emissions are calculated based on category specific method using reported activity data, survey data etc
- Satellite and sensor data are used to improve inventory as well.



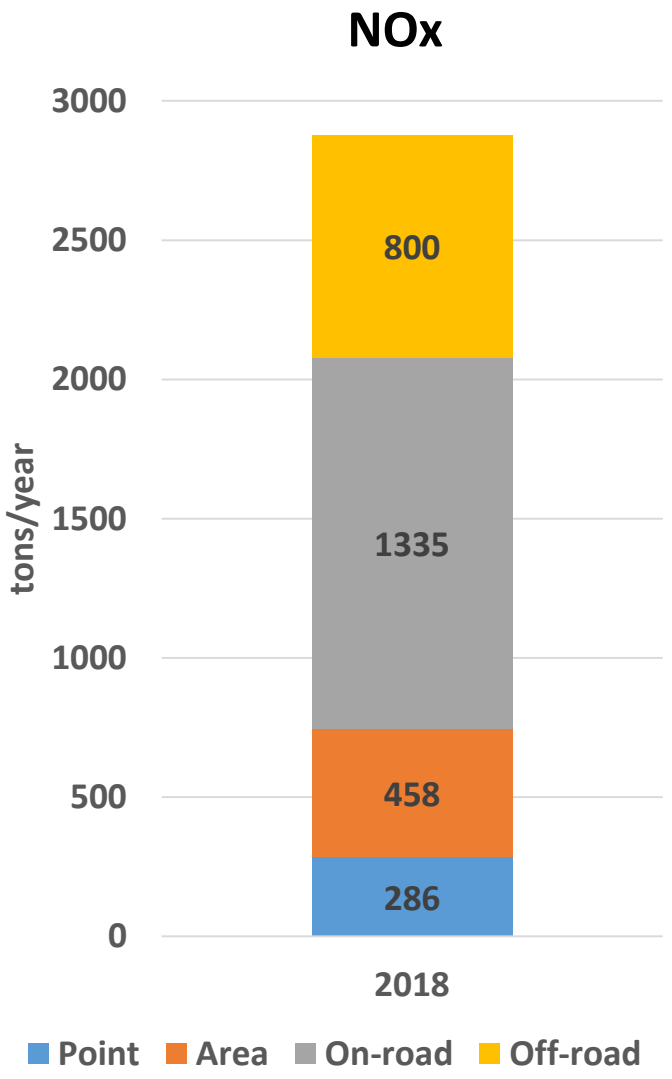


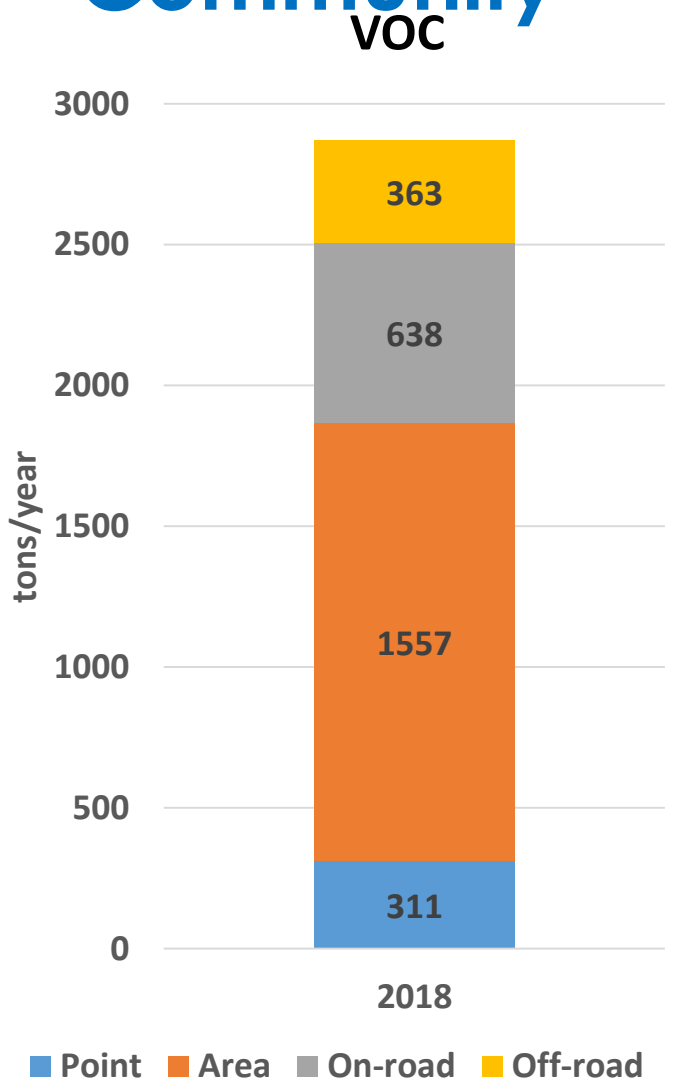


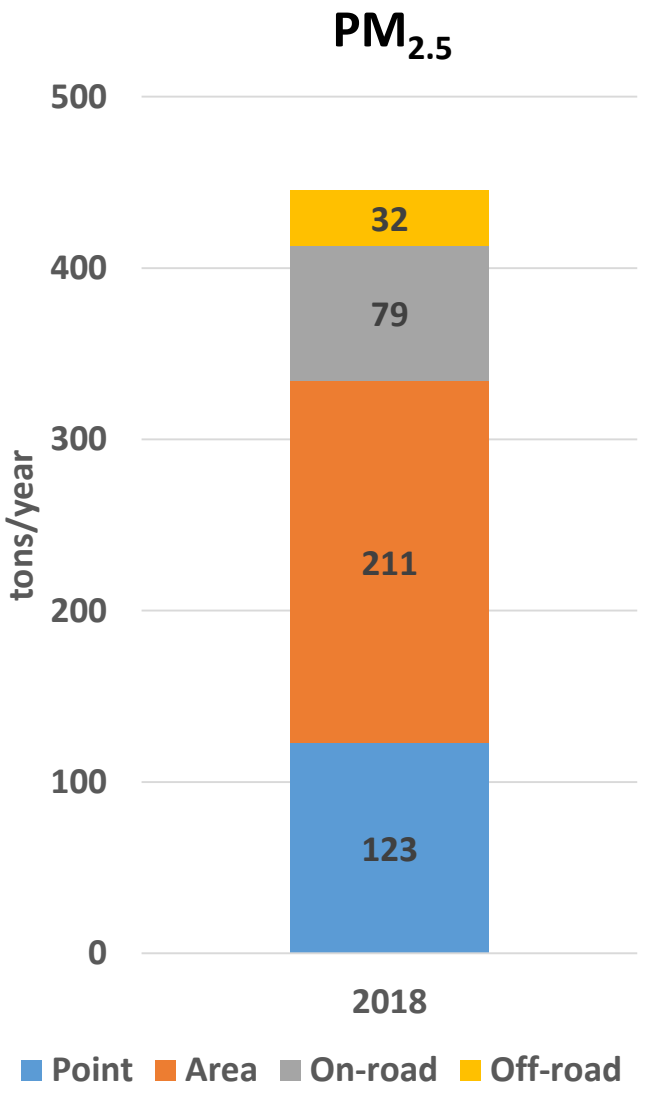
Off-road Mobile

Preliminary Emissions Inventory for 2019-Designted Communities

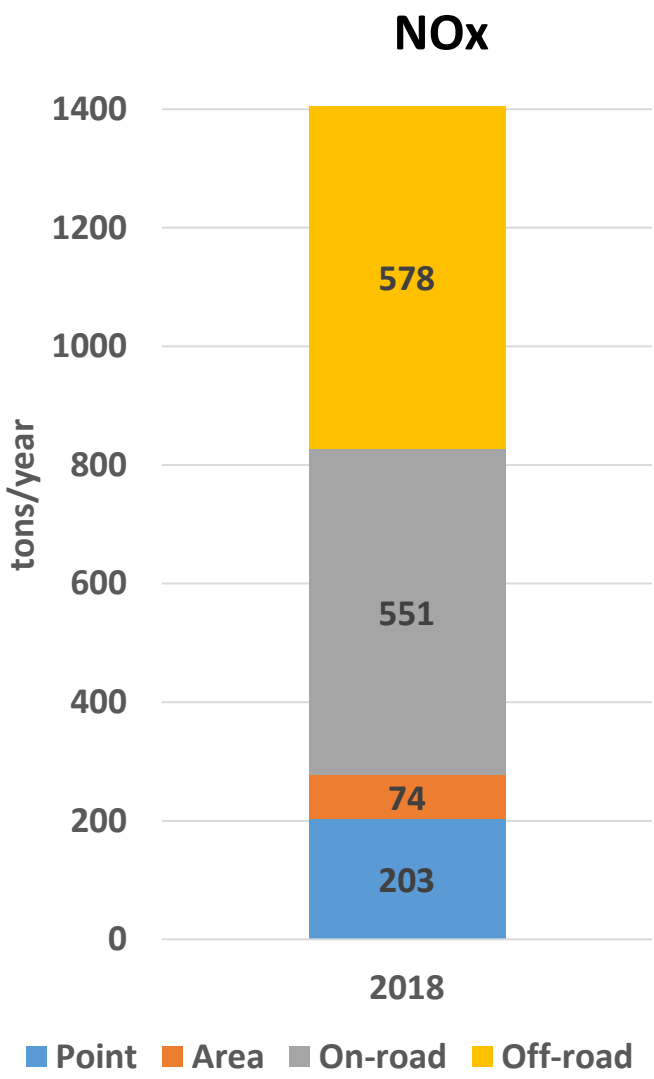
Emissions in the Emissions Study Area of Southeast LA Community

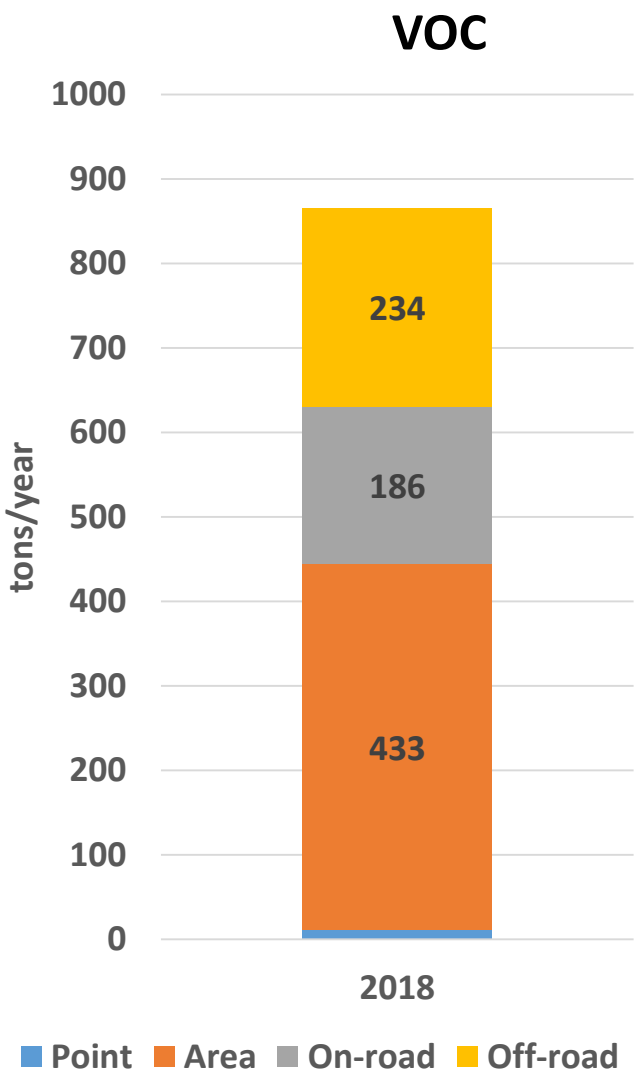


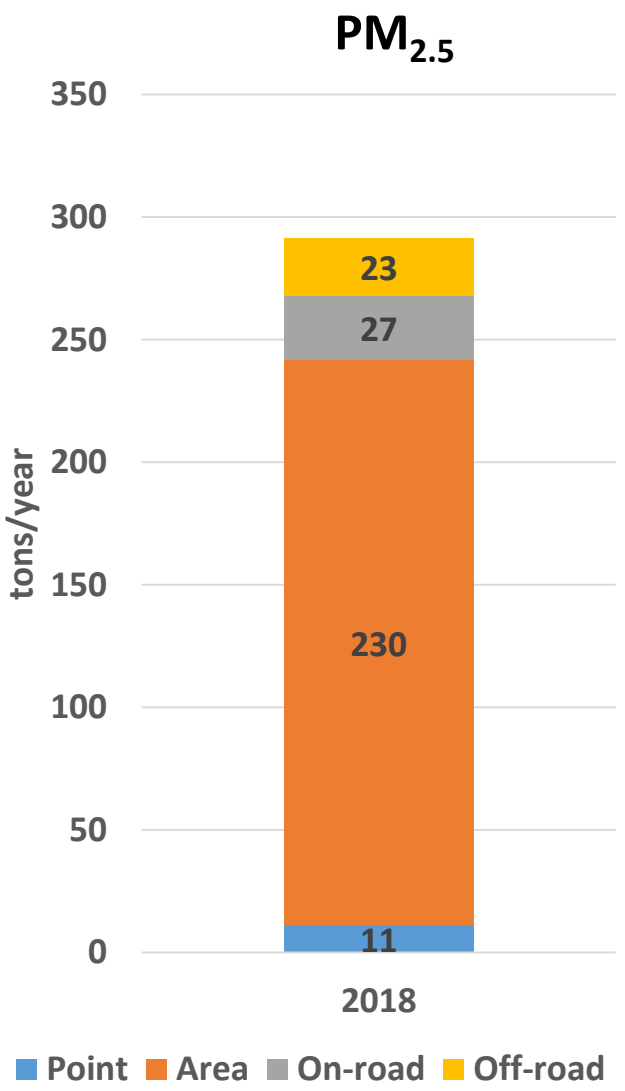




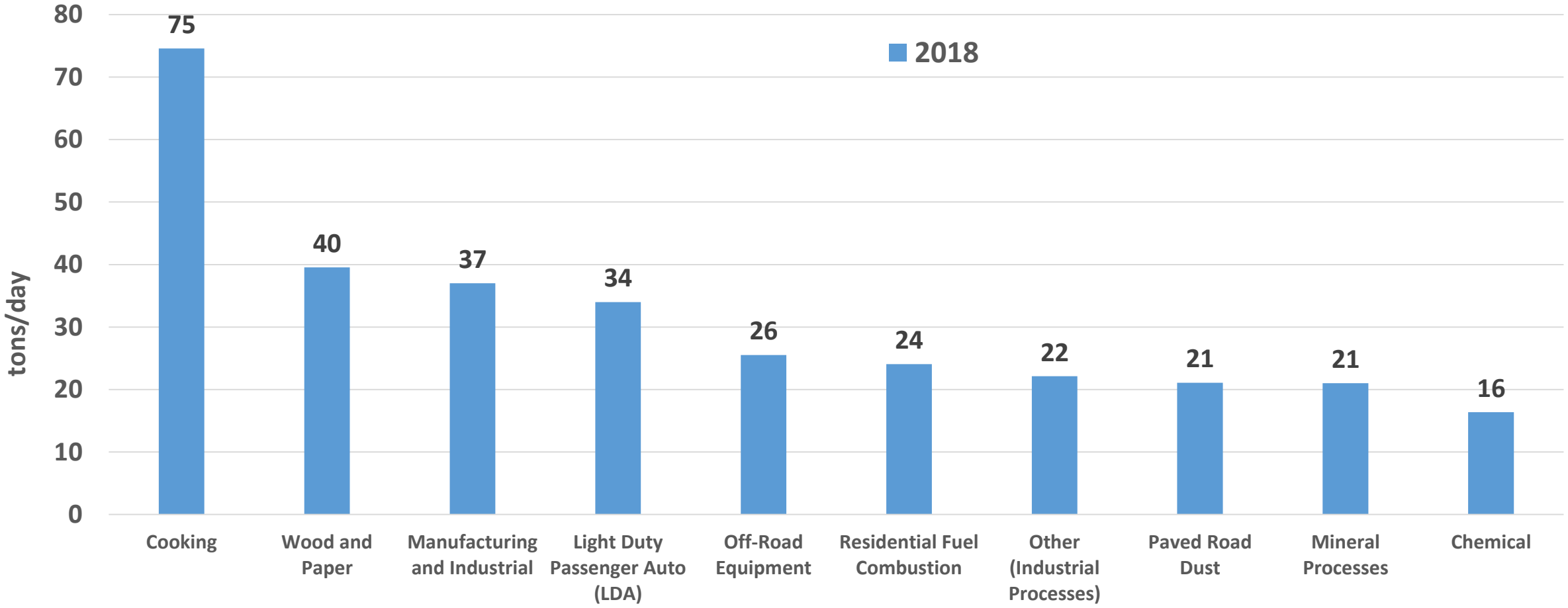
Emissions in Eastern Coachella Valley Community



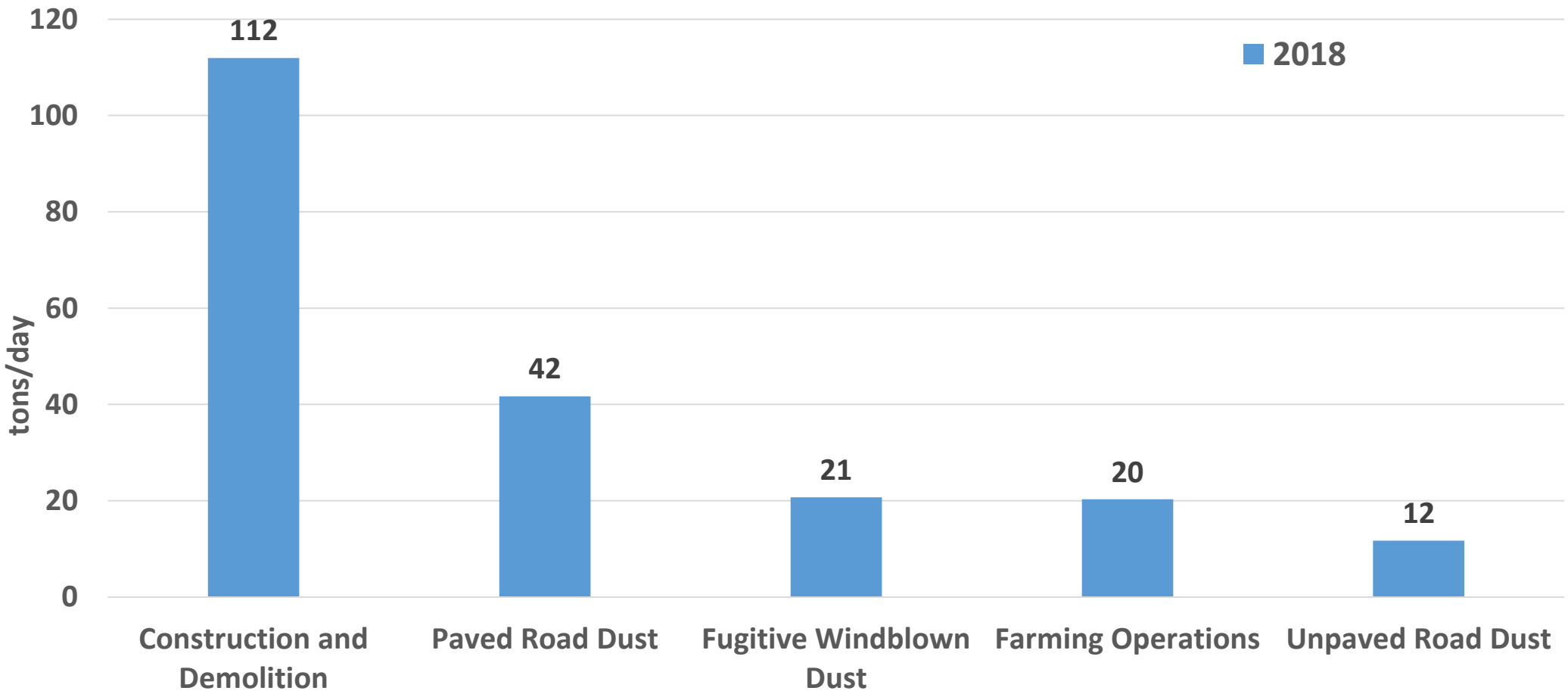




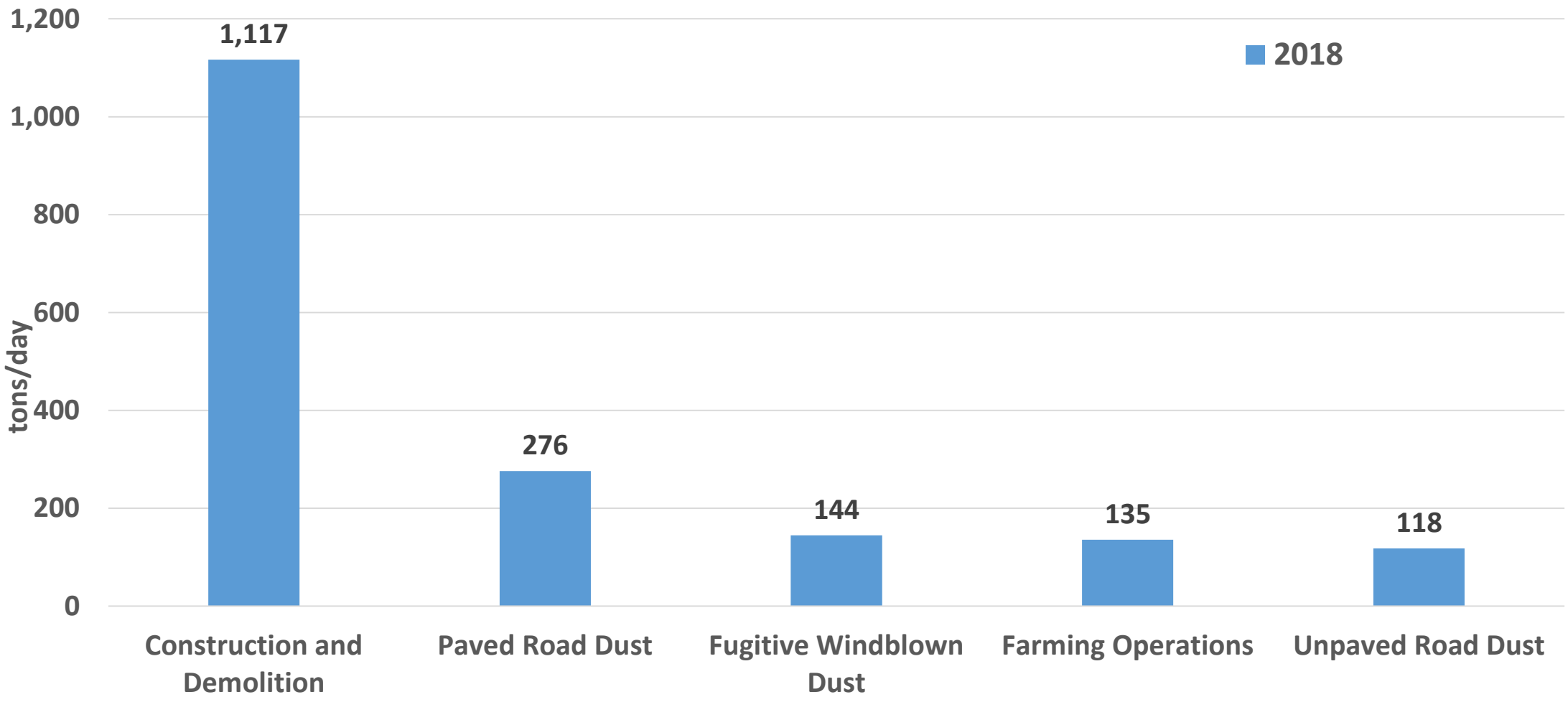
Top 10 Sources of $PM_{2.5}$ in the Southeast LA emission study area



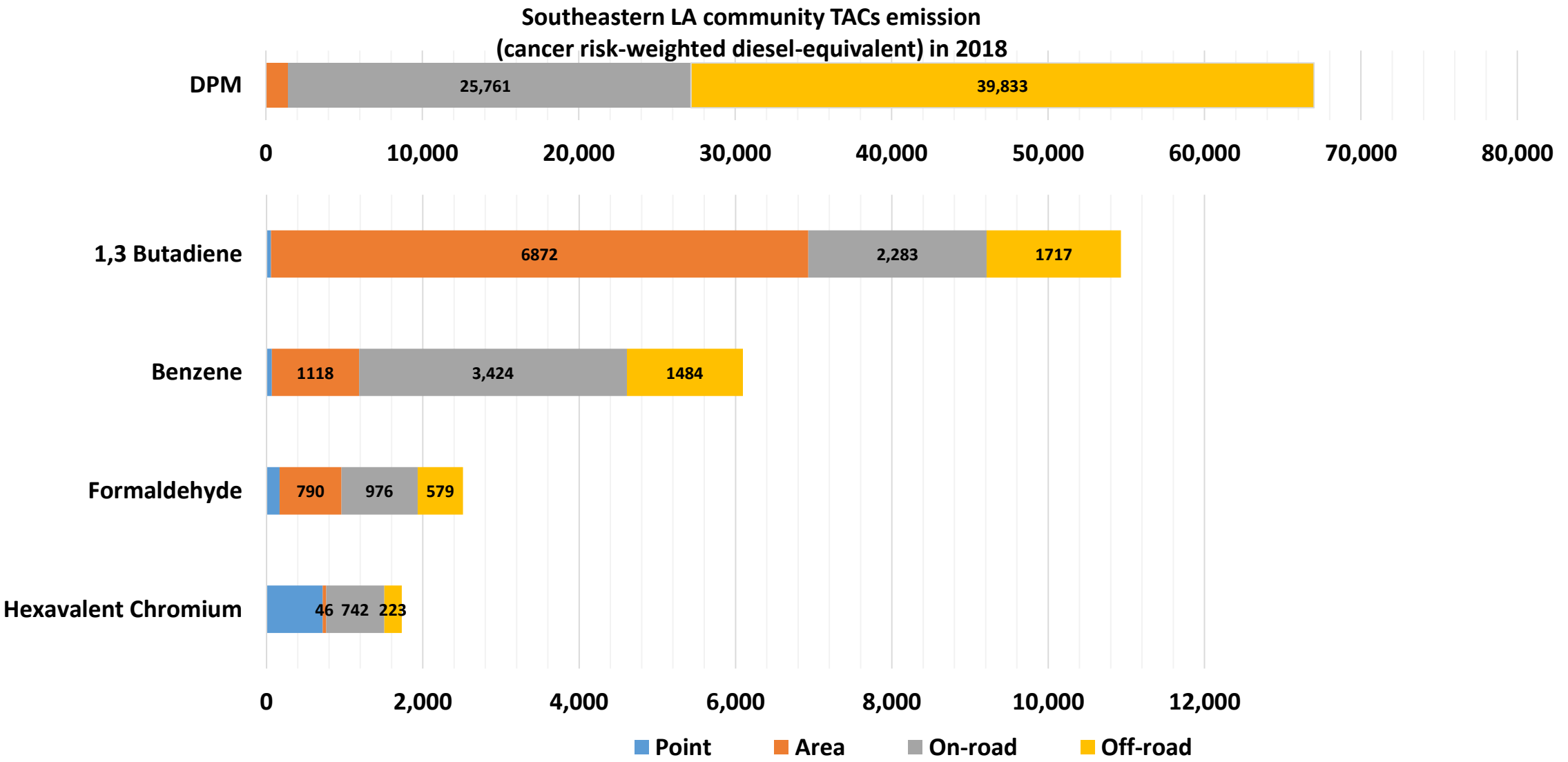
Top 5 Sources of $PM_{2.5}$ in the Eastern Coachella Valley



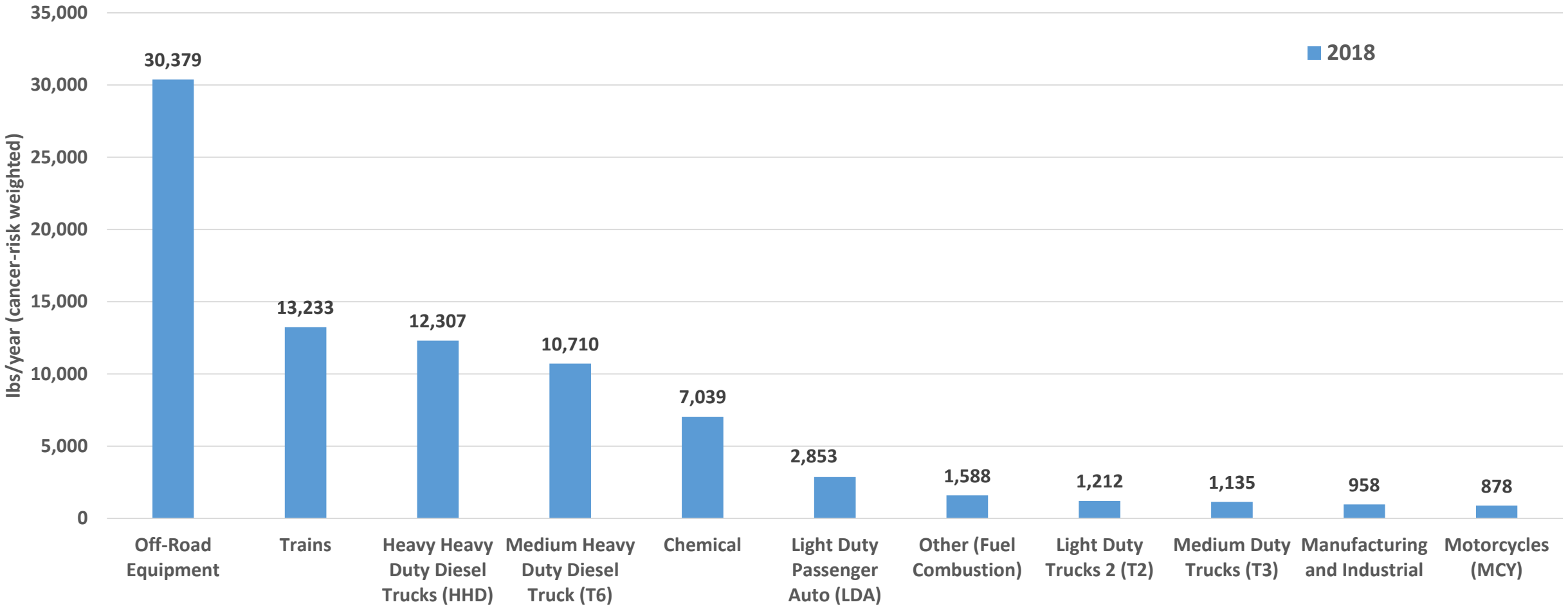
Top 5 Sources of PM_{10} in the Eastern Coachella Valley



Top 5 TACs in Southeast Los Angeles emissions study area

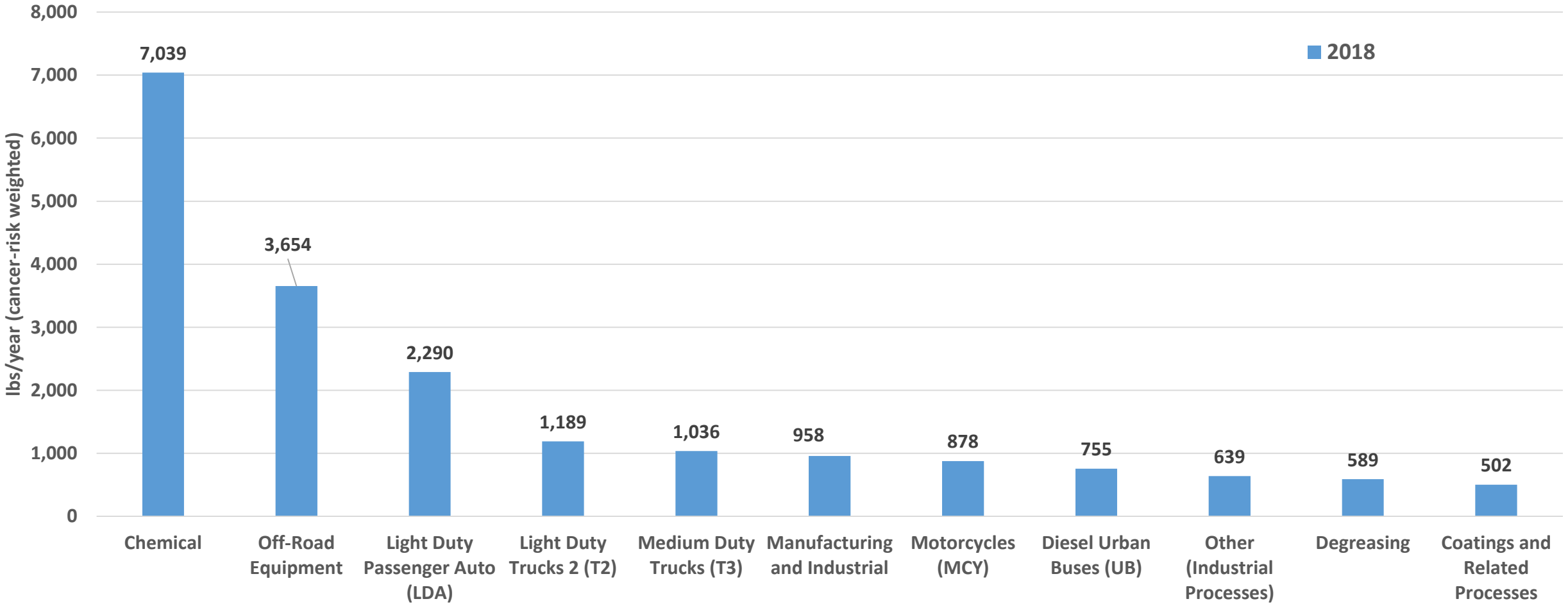


Top 10 Sources of TACs in Southeast Los Angeles emissions study area



*Emissions represent all TACs aggregated and weighted with cancer-risk

Top 10 Sources (w/o DPM) of TACs in Southeast Los Angeles emissions study area



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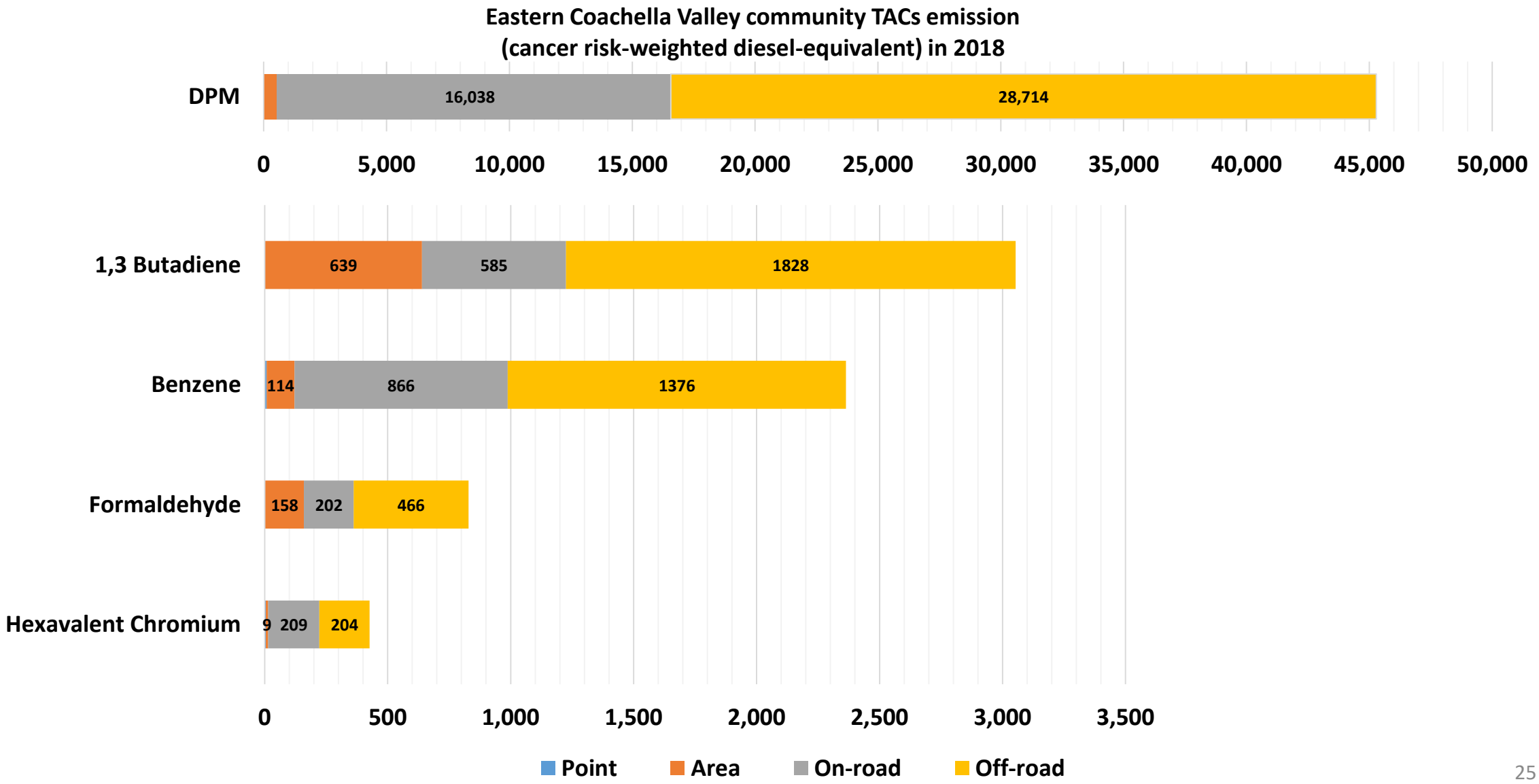
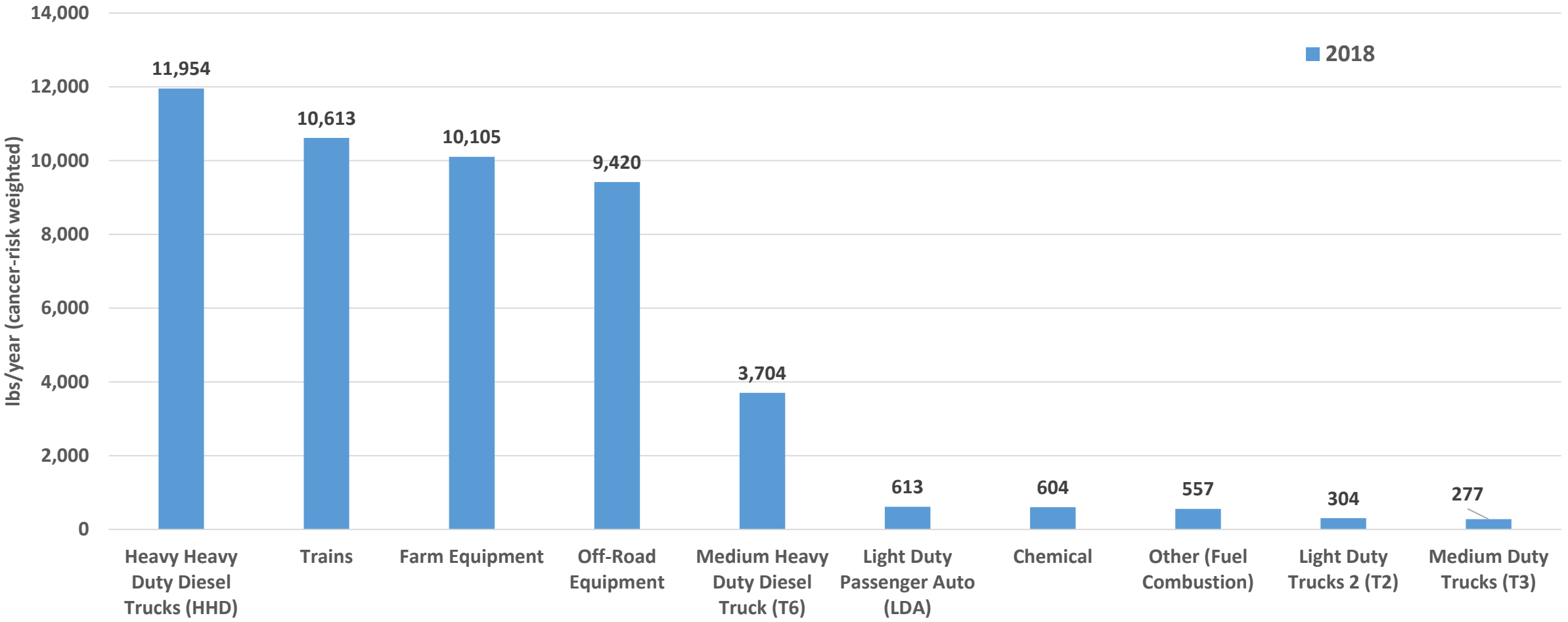
Top 5 TACs in Eastern Coachella Valley



Top 10 Sources of TACs in Eastern Coachella Valley



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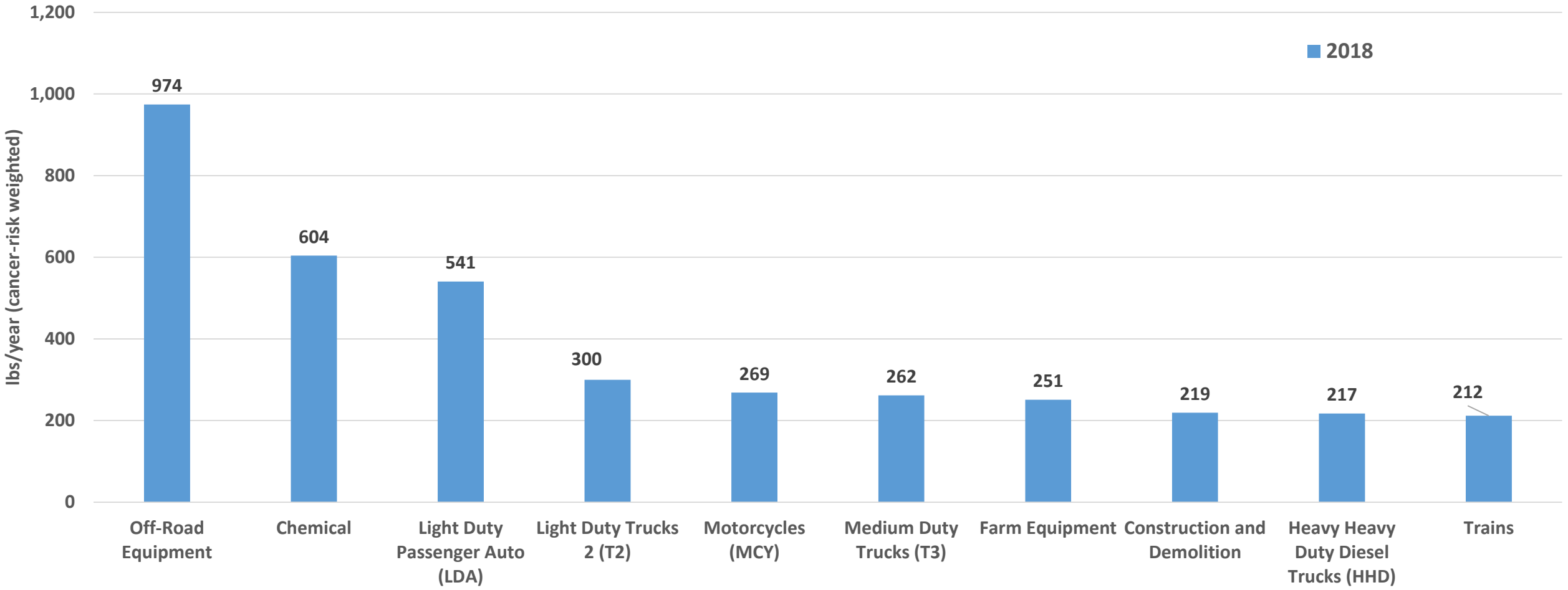
Top 10 Sources (w/o DPM) of TACs the Eastern Coachella Valley



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Summary & Next Step

- Available datasets
  - MATES IV, 2016 AQMP
  - AB617 2018-designated communities Emissions Inventory
  - AB617 2019-designated communities preliminary base year emissions
- Datasets under development
  - MATES V
  - 2022 AQMP
- Next steps
  - Continue developing 2019-designated communities future years inventory
  - Conduct neighborhood-scale modeling
- Next meeting – Fall 2020

Questions

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