

Draft 2026 Roadmap to Reduce Air Toxics



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CALIFORNIA
AIR RESOURCES BOARD

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Executive Summary

The Roadmap to Reduce Air Toxics (Roadmap) defines a path to strengthen, modernize, and reshape the California Air Resources Board's (CARB) Air Toxics Program. It describes the mission statement, core principles, major legislation and events that define CARB's Air Toxics Program, and the other agency partners that work on air toxics. The Roadmap also includes sections that describe why change is urgently needed and the specific actions we plan to take.

The mission of CARB's Air Toxics Program is to protect public health, welfare, and ecological resources by reducing or eliminating exposure to toxic air pollution while recognizing and considering effects on the economy. To achieve this mission, CARB's work must be built upon collaborative, proactive, equitable, science-based, measurable, and transparent core principles.

Air toxics in California are regulated by CARB, the United States Environmental Protection Agency (U.S. EPA), the Office of Environmental Health Hazard Assessment, the Department of Toxic Substances Control, the Department of Pesticide Regulation, and 35 air quality agencies (Air Districts). CARB's Air Toxics Program was established in 1983 with the passage of Assembly Bill (AB) 1807, with subsequent regulations including AB 2588, the Diesel Risk Reduction Plan, Senate Bill (SB) 25, and AB 617 guiding both our work and the collaborative work of our partner agencies.

Why We Must Act

CARB's efforts to reduce exposure to diesel particulate matter (DPM) emissions have been highly successful. While CARB must maintain a focus on reducing the impacts of DPM in communities, there is urgent need to elevate our focus on non-diesel air toxics to achieve similar successes.

Communities are profoundly burdened by air toxics and face serious health impacts, with cumulative exposure from multiple sources remaining a concern for health and quality of life. Communities also face pollution burdens that are significantly underestimated and not well understood, often due to lack of data. As non-diesel air toxics emerge and health science advances, we discover new information about these chemicals and their health effects. The public has a right to know what is impacting them and without accessible, understandable information about air quality, risks to communities cannot be addressed and responsible agencies cannot be held accountable. Additionally, authorities and responsibilities to address air toxic risk are currently distributed across multiple state and local agencies. Despite each agency carrying out its responsibilities correctly, gaps in authority can still lead to

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disproportionate impacts in communities. Also, the policies needed to address risk from emerging air toxics are not keeping pace or evolving to meet today's challenges. There is need to modernize policy implementation, so it better reflects today's risk challenges and supports earlier, community-prioritized emission-reduction strategies.

Our Path to Success

To achieve our mission of reducing exposure to toxic air pollution statewide, CARB will need resources and sustained partnerships to:

- Strengthen coordination with Air Districts and other agency partners
- Build and maintain relationships with communities, tribes, academics, industry, and other stakeholders
- Strengthen the scientific foundation for air toxics work
- Prioritize emerging air toxics of concern
- Increase data transparency and public access to information
- Modernize existing programs under AB 2588 and AB 1807
- Develop policies and methods to evaluate and address cumulative risk from ambient exposure
- Research and develop emissions reduction strategies

Next Steps

Each action in Our Path to Success will have its own timeline and resource constraints. However, there are two *Early Action Items* that can be initiated immediately and will set the tone for the efforts that follow. Over the next year, CARB will initiate a process to increase and improve engagement with all our partners in a more coordinated way to enhance effectiveness and efficiency. Also, as OEHHA works to finalize the draft health values, CARB will spearhead the development of statewide strategic plans to identify appropriate emissions reduction strategies for acrolein and ethylene oxide. Near term goals include strengthening the emissions inventory, developing methods to assess cumulative impacts and prioritizing our efforts to take action where it matters most.

Conclusion

CARB's Air Toxics Program plays a critically important role in improving the health and wellbeing of all Californians. CARB is dedicated to bringing about the needed changes, with this Roadmap outlining a path to reestablishing our necessary role alongside our partners to achieve success.

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Introduction

This Roadmap to Reduce Air Toxics (Roadmap) defines a path to strengthen, modernize, and reshape the California Air Resources Board's (CARB) Air Toxics Program. The Roadmap begins with an **Introduction** that describes the mission statement and core principles that will guide the Air Toxics Program. The introduction also provides background on the major legislation and events that define CARB's Air Toxics Program and highlights the other agency partners that work on air toxics. Next, there is a section on **Why We Must Act** now that explains the need for change and why these changes are needed urgently. In **Our Path to Success**, CARB describes the specific actions it plans to take to reach these goals. Then CARB discusses its **Next Steps**, defining the early action items it will take to begin building the Air Toxics Program of the future, and end with a brief **Conclusion** that highlights CARB's closing thoughts.

I. Mission Statement

The mission of CARB's Air Toxics Program is to protect public health, welfare, and ecological resources by reducing or eliminating exposure to toxic air pollution while recognizing and considering effects on the economy.

II. Core Principles

The Roadmap is grounded in six core principles: Collaborative, Proactive, Equitable, Science-Based, Measurable, and Transparent. To achieve meaningful reductions in air toxic exposures and health impacts, CARB's work must be built upon on these core principles.

Collaborative

CARB's vision for a unified air toxics program encompasses a clear and coordinated approach to risk identification, risk communication, and risk management that prioritizes and integrates strong partnerships with rapidly evolving science and practical actions. CARB's partners include California's 35 Air Districts, partner state agencies, such as the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Toxic Substances Control (DTSC), and the Department of Pesticide Regulation (DPR), and federal agencies, local governments, academia, community organizations, tribal governments, industry, and the general public.

Proactive

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CARB's approach must shift from a reactive system to a more proactive program that is forward-thinking and anticipatory of future air toxics challenges. Our goal is a revitalized Air Toxics Program that is health-protective, transparent, adaptive, and prevention-oriented. The Roadmap charts a path to enable CARB to identify significant emerging, existing, and future air toxics concerns earlier and use the best available information and science to prioritize action.

Equitable

Equity is a crucial principle that must be considered to effectively minimize public exposure to toxic air pollution and has also been centered in other CARB work including the Community Air Protection Program Blueprint 2.0.[1] Considering equity will allow staff to identify and mitigate systemic biases that have resulted in the distribution of air pollution that is experienced in California. CARB's Community Engagement Model[2] and Equity Lens[3] guide staff on how to work with communities that are disproportionately impacted by unhealthy air early and often to ensure that their expertise is incorporated into CARB action. The Community Engagement Model is an agencywide guidance document with step-by-step considerations on how to incorporate meaningful community engagement to ensure equitable outcomes for all Californians. CARB's Equity Lens is a tool that provides CARB staff with a structured, yet highly adaptable, approach to incorporate an equity impact analysis in the various planning steps for proposals of policies, programs, and actions. Meaningful engagement with communities can help identify emerging air toxics of concern, local exposure patterns, and potential sources. Furthermore, partnerships with communities can also help CARB communicate and manage health and environmental risk in ways that are clearer, accessible, and effective. By taking a statewide perspective, issues identified in one community can guide solutions that support health and equity in communities across California.

> Equity is associated with "fairness", and it recognizes that advantages and barriers exist and accordingly involves providing people with the appropriate resources and support, for their particular situation, to enable them to experience similar opportunities and outcomes as other groups. Equity does not have the same meaning as equality (sourced from Blueprint 2.0).

[1] CARB, *Community Air Protection Program Blueprint 2.0*.

[2] CARB, *Community Engagement Model*.

[3] CARB, *Equity Lens*.

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Science-Based

At a moment when federal protections for toxic air pollutants are being weakened by federal regulatory and policy rollbacks, CARB's work will continue to be founded in sound science. As federal standards become less protective, California will harness its well-founded and long-established scientific expertise to protect our communities.

"CARB remains committed to advancing science-based, cost-effective, and outcome-focused solutions to protect public health for all Californians."
"From expanding community air protection to implementing climate policies and defending our authority, our efforts are grounded in science and shaped by stakeholder engagement."

-Dr. Steve Cliff, CARB Executive Officer-

To understand the human health impact from each toxic air pollutant, and to properly reduce risk, it is essential to accurately measure and model how much of it is in the atmosphere. CARB must have reliable sampling methods and emissions factors, high-quality meteorology and speciation data, a strong procedure to characterize cumulative risk in ambient air, and the most current scientific methodologies and instruments. Sound science must be the foundation of our work. It ensures that all our partners and stakeholders can be confident that we are making decisions based on objective, provable facts and data.

Measurable

Success will be measured not only by improved scientific capabilities and stronger data quality, but by meaningful, quantifiable progress in reducing air toxics risks statewide, especially in communities disproportionately impacted by air toxic pollution.

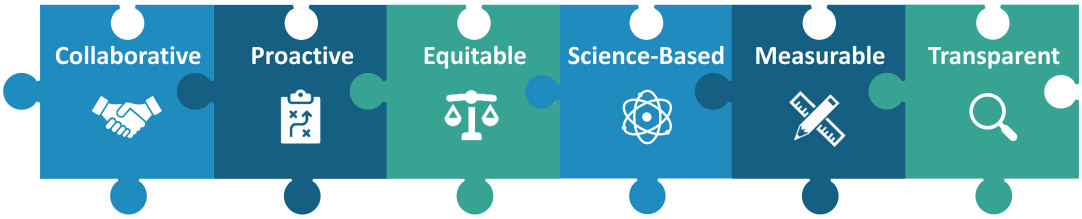
Transparent

Transparency is essential to achieving the changes CARB is committing to in this Roadmap. Our Air Toxics Program will only succeed if everyone can clearly see, understand, and act on reliable information, including air quality data. CARB is committed to providing clear, accessible, actionable, and current information about air toxics risks, data, assumptions, and decisions. Transparency will help communities, Air Districts, industry, and other partners understand how risks are identified, prioritized, communicated, and reduced. This ensures that all our partners know what we've accomplished and what remains to be done.

The graphic below highlights the foundational principles for re-establishing a stronger and more comprehensive Air Toxics Program.

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CARB Air Toxics Program: Core Principles



III. Background

CARB's Air Toxics Program was established in 1983 with the passage of Assembly Bill 1807 (AB 1807), known as the *Toxic Air Contaminant Identification and Control Act* (Stats. 1983, Ch. 1047; Health & Saf. Code § 39650 et seq.).[4] This law gave CARB a process for identifying Toxic Air Contaminants (TAC) and developing statewide Airborne Toxic Control Measures (ATCM).[5] ATCMs are regulations created by CARB that require emissions reductions and are based on authority that has been given to CARB by state law. Since then, CARB has identified over 200 substances and groups of substances as TACs and developed and implemented 30 ATCMs for a variety of air toxics (Cal. Code Regs., tit. 17, § 93100 et seq.).

In 1987, the legislature passed Assembly Bill 2588 (AB 2588), known as the *Air Toxics "Hot Spots" Information and Assessment Act* (Stats. 1987, Ch. 1252, Health & Saf. Code § 44300 et seq.).[6] This law requires stationary sources, such as factories, to report toxic air emissions, prepare health risk assessments, and notify the public. As a result, stationary sources are required to submit an inventory of their toxic air emissions, assess any health risk from those emissions, and publicly notify surrounding communities. The Air Toxics "Hot Spots" Program began as a public right-to-know law and was later expanded to require risk reduction to established acceptable levels.

In 1998, diesel particulate matter (DPM) was identified as a TAC. Because diesel engine use is so widespread and common, the particulate matter they emit poses a serious threat to the health and welfare of all Californians. To address this risk, in 2000 CARB adopted the *Risk Reduction Plan to Reduce Particulate Matter Emissions*

[4] AB 1807, *Health & Saf. Code § 39650 et seq.*

[5] CARB, *Airborne Toxic Control Measures (ATCM).*

[6] AB 2588, *Health & Saf. Code § 44300 et seq.*

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from Diesel-Fueled Engines and Vehicles, also known as the Diesel Risk Reduction Plan.[7] The plan emphasized the importance of controlling emissions of DPM from many different types of sources, such as on-road and off-road vehicles, stationary diesel engines, locomotives, and ocean-going vessels.

The Diesel Risk Reduction Plan set out ambitious goals to reduce the emissions (and risk) from diesel engines by 75% in 2010 and 85% in 2020. Although we have been successful, having reduced statewide DPM emissions by 86% through 2025, in communities where diesel engine use is concentrated, risk is still unacceptably high and efforts to reduce DPM must continue. However, the drastic reduction in statewide diesel emissions is a success story and shows that a sustained effort can lead to meaningful and significant public health gains.

In 1999, the Children's Health Protection Act, Senate Bill 25 (SB 25) (Stats. 1999, Ch. 731, Health & Saf. Code § 39669.5), was enacted into law, which established specific requirements to examine the impacts of air pollution on children's health.[8] SB 25 required CARB to review ambient air quality standards from this perspective, evaluate the statewide air monitoring network and include additional monitoring to assess children's exposure and develop any additional ATCMs necessary to protect children's health.

In 2017, the Community Air Protection Program (CAPP) was created by the passage of Assembly Bill 617[9] (AB 617) (Stats. 2017, Ch. 136, Health & Saf. Code § 44391.2). AB 617 brings together CARB, local Air Districts, community members, community-based organizations, environmental justice organizations, regulated industries, and other key stakeholders to develop and implement Community Emission Reduction Programs (CERP) for each community in the CAPP to reduce air pollution emissions and exposures in neighborhoods most impacted by air pollution. The Roadmap and CAPP have important synergies in addressing community concerns to air toxics.

To understand the importance of the changes CARB is proposing in this Roadmap, it is helpful to understand the definition of air toxics. An air toxic is an air pollutant that has the ability to become airborne and is known to have a health impact that may be significant for people, including unborn children, or contribute to an increased likelihood of people dying. When CARB evaluates these threats, we consider toxic compounds for which available evidence indicates they do, or may, pose a threat to

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[7] CARB, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (Diesel Risk Reduction Plan) (Oct. 2000), *Program webpage*.

[8] SB 25, *Health & Saf. 39669.5*

[9] Community Air Protection Program (CAPP), *AB 617*.

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public health. There are currently more than 1,900 air toxic compounds on CARB's "Hot Spots" list, including the over 200 CARB-identified TACs, with CARB continuously learning about more air toxic chemicals.[10, 11, 12] Compounds identified as TACs typically have no level of emissions below which harmful impacts are not expected to occur and 58% of TACs currently have an OEHHA approved health value.

What is the difference between an air toxic and a Toxic Air Contaminant? There is a very specific process, which is spelled out in California Health and Safety Code that CARB must follow to identify an air toxic as a TAC. This process must be completed before CARB can take action to regulate that TAC with an ATCM. So TACs are a specific subset of all air toxics. But it's also important to understand that all air toxics are harmful and can cause serious impacts like cancer or other serious illnesses.

In California, air toxics are regulated by the U.S. Environmental Protection Agency (U.S. EPA) and many state and local agencies. At the State level, there are several agencies, including CARB, OEHHA, DTSC, and DPR that work on air toxics.

CARB is the lead agency for California's fight against climate change and oversees all air pollution control efforts in the state to attain and maintain health-based air quality standards. In terms of air toxics specifically, CARB is responsible for identifying and controlling TACs, informing the public of significant toxics and exposures, and addressing health impacts to communities, children and other sensitive receptors.

OEHHA is the lead state agency for the assessment of health risks posed by environmental contaminants. OEHHA evaluates harmful chemicals and other environmental hazards, to understand interconnected environmental health burdens faced by individuals and communities in California. OEHHA sets the health values for cancer-causing and non-cancer-causing air toxics that are used to evaluate health risks.

DTSC is responsible for protecting people, communities, and the environment from hazardous substances. DTSC implements the state's hazardous waste management program, oversees the restoration of contaminated land, and advances safer consumer products. For example, DTSC oversees cleanups to safely remediate hazardous substances that pose risks to communities and regulates the use of toxic

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[10] The EICG Appendix A chemical list now includes 1,925 chemicals. Appendix A-I includes 1,457 chemicals (including 3 broad functional groups), A-II includes 184 and A-III includes 284. During the 2020 EICG amendment process, 994 chemicals were added to A-I, 13 to A-II and 162 to A-III. (In a few cases, a chemical was moved from A-II to A-I).

[11] CARB, *AB 2588 Appendix A Search Tool*.

[12] CARB, *CARB Identified Toxic Air Contaminants (TAC)*.

chemicals in consumer products, most recently the use of toluene in nail products. DTSC works alongside local Certified Unified Program Agencies by providing resources, guidelines, and training.

DPR that fosters sustainable pest management and regulates pesticides. They evaluate pesticides, mitigate risks, enforce pesticide laws and regulations and advance the availability and adoption of sustainable pest management practices. DPR establishes health-based thresholds for pesticides, monitors regulated pesticides, and evaluates pesticides for regulatory actions. DPR oversees county agriculture commissioners in the local administration of pesticide use enforcement. TAC pesticides are regulated in their pesticidal use by DPR. DPR has authority, in consultation with state and local agencies including CARB and air districts, to conduct risk assessments to identify pesticide TACs and, where necessary, to adopt control measures to address exposures to TACs and protect human health.

CARB partners with 35 local air quality agencies (Air Districts). CARB and the Air Districts work together to regulate air toxics. The Air Districts are responsible for regional rulemaking, air quality planning, monitoring, stationary source permitting and enforcement, as well as administering grants. For example, they are the primary on-the-ground implementers working closely with facilities regulated under the Air Toxics "Hot Spots" (AB 2588) requirements. They carry out AB 2588's public notification requirements, ensuring that communities are informed when facility-specific health risks exceed established thresholds. Air Districts are also most often the agencies that implement CARB's ATCMs for stationary sources and have been at the forefront in implementing air toxics emissions reductions over many decades. Air Districts can also enact their own rules to control air toxics; however, those rules have to be at least as stringent as federal and state requirements. Lastly, Air Districts carry out the CAPP (AB 617), working with communities across the state to develop and implement CARB-approved CERPs.

Over the last several years, greater reporting of toxic air emissions under AB 617, improved monitoring methods for air toxics, and emerging health evidence on toxic air pollutants have highlighted the need to broaden our efforts to address non-diesel air toxics, in addition to continued work on diesel. Under recent reporting regulations, CARB has seen a 75% increase in the number of facilities reporting emissions and a 72% increase in the number of air toxics reported between 2020 and 2024.

This Roadmap seeks to address why we must act now to modernize California's Air Toxics Program, our path to meeting those needs, and the immediate next steps we intend to take to put this plan into action. We face many challenges now, and will face

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many more in the future, but with improved technical tools, coordination with our partner state agencies and local Air Districts, collaboration with community groups, public feedback, input from and cooperation with industry, and CARB's commitment, we can meaningfully reduce risk from air toxics and provide a more healthful future for all Californians.

Why We Must Act

Since the start of CARB's Air Toxics Program, we've enacted 18 regulations to reduce health risks from 11 non-diesel TACs and 12 regulations to reduce health risks from sources of DPM. The 12 diesel-focused regulations are some of the nation's most ambitious mobile-source regulations to address risk from DPM– a policy framework credited with reducing emissions and successfully meeting ambitious targets.[13,14]

CALIFORNIA'S DIESEL RISK REDUCTION PROGRAM SHOWS WHAT'S POSSIBLE WHEN SCIENCE, STRONG STANDARDS, AND PARTNERSHIP COME TOGETHER. WITHOUT DELAY, WE MUST TACKLE THE REMAINING AIR TOXICS THREATENING COMMUNITIES.

CARB's efforts to reduce exposure to DPM emissions have been highly successful and have demonstrated that when we focus on reducing toxic air pollution, we can bring about emission reductions.

Although CARB will continue to focus on reducing the impacts of DPM in communities where diesel sources still drive health risks and negative health outcomes, we also need to focus our efforts on non-diesel air toxics. With the same level of focus and commitment, we can have similar successes.

Success in reducing risks from non-diesel air toxics is extremely important for public health protection. DPM is just one of more than 1,900 air toxics on CARB's list of toxic compounds that are known or suspected to cause adverse health impacts. The health risks from many of those air toxics impact communities in their daily lives. Reducing these impacts can provide much needed public health improvement.

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[13] CARB, *California Air Toxics Assessment (CATA)*.

[14] CARB, *California Air Toxics Assessment (CATA) Mapping Tool*.

I. Communities are Profoundly Burdened by Air Toxics and Face Serious Health Impacts

Communities across California have made one message clear - cumulative exposure to air toxics remains a serious concern for health and quality of life. There are thousands of chemicals from many different types of sources being emitted across California, with some disadvantaged communities bearing a larger burden than others.[15] These differences often stem from long-standing land-use inequities rooted in historical racial segregation and redlining practices. The following section provides a few examples of burdens experienced by communities from specific types of sources across California. They show the types of air toxics concerns experienced across the entire state, while recognizing that some communities face greater cumulative burdens because of where sources are located.

Mobile Sources



Images source: CARB media library

Mobile source emissions continue to be an ongoing toxic risk from fuel combustion, fuel evaporation, and particulate matter from brake and tire wear. In addition to previously known pollutants, new scientific findings indicate that acrolein may pose a cancer risk to Californians and draft estimates of risk indicate a cause for concern. While research is still needed to assess the contributions of various sources, preliminary analyses suggest mobile sources are an important contributor to total statewide risk.[16] Continued regulatory and nonregulatory efforts to reduce emissions from this sector will be necessary to address risks.

Petroleum Production and Refining

In the petroleum-producing regions of the state, there are communities including, but not limited to, Lost Hills, Inglewood, Oildale, Ford City, and Taft, where thousands of active and abandoned oil wells sit next to homes, posing health risks that have not

[15] OEHHA, *CalEnviroScreen 4.0 and Race/Ethnicity Analysis* (2021), *StoryMap*.

[16] CARB & OEHHA, *Acrolein Frequently Asked Questions* (May 14, 2026).

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been sufficiently studied.[17] For example, Lost Hills, sits downwind of hundreds of active and abandoned oil and gas wells that have the potential to emit air toxics, including acrolein, benzene, ethylbenzene, hydrogen sulfide, and heavy metals.

In the San Francisco Bay area, communities like Richmond, Rodeo, Benicia, and Martinez, and in Southern California communities like Wilmington, Carson, West Long Beach, Rancho Dominguez, Torrance, Manhattan Beach, and El Segundo, are located near major petroleum refineries – and the associated truck traffic, pipelines, and flaring events. As a result, people living in these communities face elevated cumulative exposures to air toxics, including benzene, which targets the blood, nervous system, and prenatal and early childhood development, and hydrogen cyanide, which targets the nervous, endocrine and cardiovascular systems.





Images source: CARB media library

For a more specific example, in the Richmond, North Richmond, and San Pablo community, which the Bay Area Air District nominated and CARB selected as an AB 617 monitoring community in 2018, refinery flaring has been a persistent source of concern to residents. As the community worked to develop its air monitoring plan[18], flaring events emerged as a recurring issue, and a large number of these events have occurred over the years since. When flares ignite, residents describe health reactions to the emissions, and the large, billowing clouds of smoke rising over the community are deeply unsettling to witness. Because flaring is often unplanned and can release a mix of air toxics, it represents exactly the kind of localized, episodic exposure that community-scale attention under AB 617 is meant to surface. Through the Path to Clean Air Community Emissions Reduction Plan,[19] the community has made addressing flaring a formal priority. One CERP strategy calls for amending air district rules to better characterize the emissions released during flaring events and to establish stronger enforcement mechanisms that discourage routine, preventable

[17] California Council on Science and Technology (2015). "An Independent Scientific Assessment of *Well Stimulation in California*."

[18] *AB 617 Richmond- San Pablo Community Air Monitoring Plan* (2020).

[19] PTCA Community Steering Committee & Bay Area Air District: *Community Emissions Reduction Plan*.

flaring.[20] The aim is both to give the community and regulators a clearer picture of what toxics residents are actually being exposed to and to ensure that flaring is reserved for genuine emergencies rather than treated as a normal cost of refinery operation.

Autobody Shops

Clusters of licensed and unlicensed autobody shops in communities throughout California expose residents to air toxics, primarily from automotive coatings such as paints, primers, clear coats, and hardeners. These products can contain chemicals such as parachlorobenzotrifluoride (PCBTF), which is a carcinogen, and isocyanates, which are also carcinogens and specifically target and harm the respiratory system. Other shop activities, including solvent use, surface preparation, and cleanup, may also contribute to emissions.

Wildfires



Images source: CARB media library

Residents in communities all over California also experience short-term exposure to air toxics from emergency events such as wildfires. A CARB analysis[21] of air quality data collected during the deadly Camp Fire shows residents across much of Northern California were exposed to dangerous amounts of particulate matter that contained concerning levels of toxic metal contaminants, including lead, which spiked for about 24 hours. In recent research[22] following the 2025 Los Angeles wildfires, elevated levels of airborne chromium-containing nanoparticles, including cancer-causing hexavalent chromium (Cr(VI)), were found in debris cleanup areas and surrounding communities.

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[20] PTCA Community Steering Committee & Bay Area Air District: *Appendix A- Detailed Action Descriptions*.

[21] CARB, *Camp Fire Analysis*, Metal Contaminants (2018): *Press release*.

[22] Kleeman, J.J., Cappa, C.D., Green P.G., et al., *Airborne Hexavalent Chromium Nanoparticles Detected Around Cleanup Zones for the 2025 Los Angeles Wildfires*, Commun. Earth & Env., 7 Art. No. 608 (2026).

Agriculture

In agricultural regions, many communities live near fields where pesticides are applied, including chemicals associated with cancer or other serious health effects. DPR regulates pesticide use, including limiting when and where restricted material pesticides may be used prior to when applications occur. Communities in agricultural regions may also face exposure to particulates from diesel engines, adding to the cumulative air toxics burden in rural areas.



Images source: CARB media library

Metal Processing

In Maywood and Paramount, residents are exposed to elevated levels of Cr(VI) from chrome plating, metal forging, and metal processing, which can increase the risk of lung and nasal cancers. Community concerns about these exposures helped drive air monitoring conducted by the South Coast Air Quality Management (SCAQMD) district. The results of that monitoring led to the revision of South Coast Rule 1469, which regulates hexavalent chromium emissions from chromium electroplating and chromic acid anodizing operations, and the 2023 amended statewide *ATCM for Chromium Plating,*[23] which phases out the use of Cr(VI) for decorative chrome plating, both of which significantly reduce emissions from chrome plating facilities. Despite these successes, Cr(VI) continues to be emitted by metal forging and metal processing facilities. As part of CARB's continued effort to reduce community exposure to Cr(VI), we have committed two technology reviews: the first, on alternatives to hexavalent chromium in functional chrome plating by January 1, 2032, and the second on alternatives to hexavalent chromium for functional chrome plating By January 1, 2036.

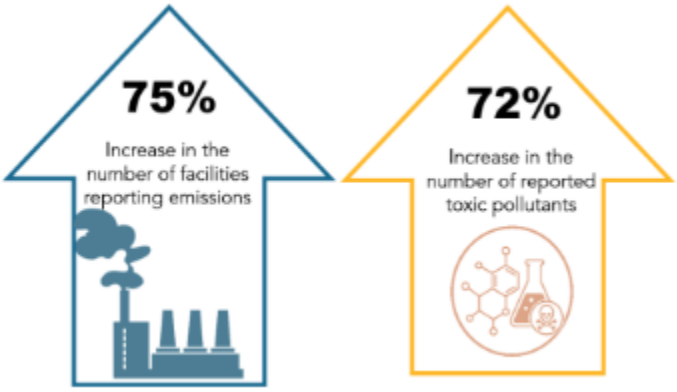
II. Non-diesel Air Toxics are Emerging Rapidly and Eclipsing Previously Understood Risks

Communities are facing pollution burdens that are significantly underestimated and not well understood, often due to lack of data on what is being emitted and how much. In November 2020, the CARB Board approved significant amendments to two key emissions data collection programs: the Regulation for Reporting of Criteria Air

[23] *Cal. Code Regs., tit. 17, § 93102*; See also CARB, *Chrome Plating ATCM Webpage*.

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Pollutants and Toxic Air Contaminants (CTR)[24] (Cal. Code Regs., tit. 17 § 93400 et seq.) and the Emission Inventory Criteria and Guidelines Regulation (EICG)[25] (Cal. Code Regs., tit. 17 § 93300 et seq.). These amendments mean more facilities have to report toxic emissions, more toxic pollutants have to be reported, and reporting happens more often. Previously, emissions and usage data from autobody shops, dry cleaners, and gas stations were commonly reported as county-wide totals for each sector, rather than by individual facilities. Now these facilities report individually, giving everyone better data about the location and amount of emissions. In addition, reporting now covers nearly 1,500 pollutants, along with three broad functional groups[26] that bring in additional pollutants. This is an increase of more than 1,000 chemicals that must be reported under the new EICG and CTR requirements.



Since the amendments, CARB has seen a 75% increase in the number of facilities reporting emissions and a 72% increase in the number of air toxics reported between 2020 and 2024. This increase in the number of facilities and pollutants will help CARB to find and better understand risks we haven't previously identified. As we learn more about these risks and share that information with our partners, we will need to identify strategies and develop plans to reduce them. Despite recent advancements in emission reporting, gaps remain in the data being submitted and in our understanding of what information to request. These gaps are evident given the limited source testing and constrained laboratory capabilities across the state, which make it difficult to assess emissions and fully characterize certain pollutants. Furthermore, as we learn more about the health impacts of toxics, new questions will need to be answered to address risks.

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[24] CARB, *Regulation for Reporting of Criteria Air Pollutants and Toxic Air Contaminants (CTR)*.

[25] CARB, *Emission Inventory Criteria and Guidelines Regulation (EICG)*.

[26] Adding functional groups was a necessary step to address chemical analogues, where a manufacturer would slightly alter a chemical's structure to achieve the same chemical behavior. To date, three chemical functional group classes (plus subclasses) have been established in consultation with the *Scientific Review Panel on Toxic Air Contaminants* (SRP). These three functional group classes are certain types of per- and polyfluoroalkyl substances (PFAS), isocyanates, and polycyclic aromatic hydrocarbons containing chlorine or other halogens.

With the increasing number of reported facilities and pollutants comes an increase in the number of chemicals being evaluated for their potential to impact public health. For example, in May 2026, OEHHA released two draft reports with new findings on the cancer potencies of acrolein and ethylene oxide.[27,28] Both chemicals are present in the ambient air and can cause cancer with lifetime exposure.

The OEHHA reports outline the latest research on the potential excess cancer risk from long-term exposure to these air toxics. Based on that research and CARB's statewide air monitoring data, the average estimated excess cancer risk from acrolein is approximately 1,300 chances in a million statewide. This means that if one million people were exposed to the statewide average monitored levels of acrolein continuously over a period of 70 years, it is estimated that approximately 1,300 of them may develop cancer due to this exposure, in addition to the background rates of developing cancer from all other causes. This magnitude of risk puts it on par with the potential cancer risk diesel exhaust posed when it was first identified as a major concern more than two decades ago. Using a similar approach, the average excess cancer risk from ethylene oxide is estimated to be approximately 980 chances in a million statewide, making them both air toxics of concern. While these cancer risk estimates reflect the best available science and indicate a cause for concern, they are based on limited air monitoring data with known limitations and notable uncertainties.[29] Evaluation of just these two emerging air toxics increases the estimated cancer risk from air toxics by more than five times what CARB previously understood to be the statewide potential cancer burden today.[30] As more air toxics are reported, and the health impacts of these chemicals are better understood, the magnitude of this risk is expected to increase.

When considering just two new emerging air toxics (acrolein and ethylene oxide), the estimated cancer risk is more than five times higher than what CARB previously understood to be health risks from air toxics today.

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[27] OEHHA, *Acrolein Inhalation Unit Risk Factor (IUR)* (May 29, 2026).

[28] OEHHA, *Ethylene Oxide Inhalation Unit Risk Factor (IUR)* (May 29, 2026).

[29] These uncertainties and limitations are described further in the FAQs for acrolein and ethylene oxide. See CARB, *Emerging Air Toxics of Concern*.

[30] CARB, *California Air Toxics Assessment (CATA) Mapping Tool*.

III. Risk Cannot be Addressed and Responsible Agencies Cannot Be Held Accountable Without Accessible, Understandable Information About Air Quality

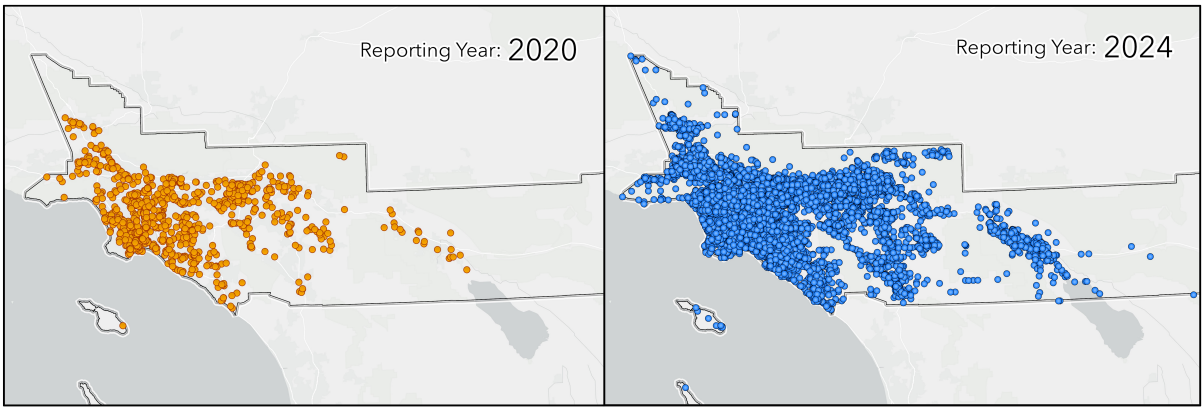
The public has a right to know everything that is impacting them, but the tools we have today don't always meet that need. Tools that map local emissions provide important benefits to communities, communicating meaningful information about pollutants released in their neighborhoods and air quality conditions. They can also help better characterize risk, including the cumulative effects of multiple sources and multiple pollutants impacting communities. Without them, community members are less equipped to engage in decision-making, hold decision-makers accountable, or advocate meaningfully for state and local action.

New Emissions Data

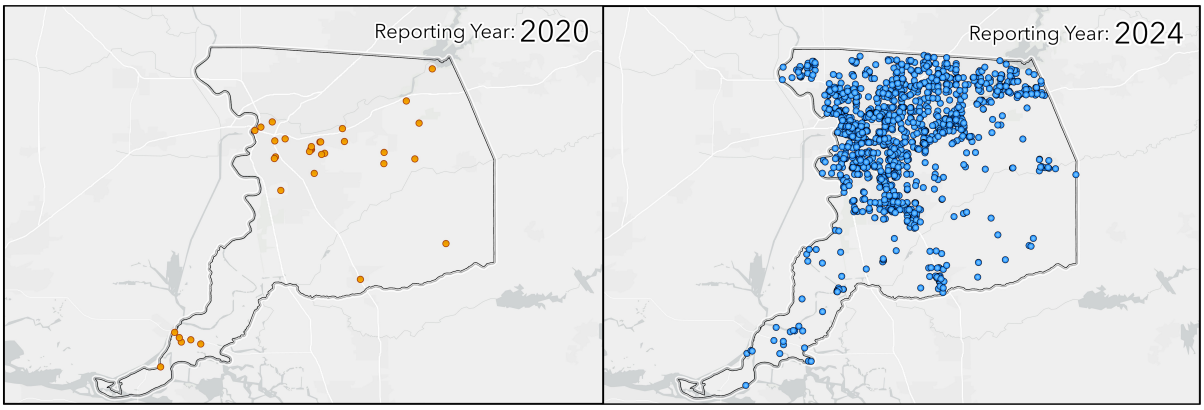
New and more complete information is becoming available as Air Districts and facilities implement the amended EICG and CTR regulations. As an example, the maps below compare the number of facilities reporting air toxics emissions under state and local requirements in the South Coast Air Quality Management District and Sacramento Metropolitan Air Quality Management District in 2020 and 2024. This increase in the number of facilities reporting, along with their emissions, will give the public a much better understanding of what pollutants they may be exposed to in their communities.

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Facilities Reporting Air Toxics Emissions in the South Coast Air Quality Management District



Facilities Reporting Air Toxics Emissions in the Sacramento Metropolitan Air Quality Management District



Images source: These maps were generated from data in CARB's Facility Search Tool.

CARB currently does not have enough resources available to analyze these growing data sets or create easy-to-use public tools. To fix this, we need to prioritize speeding up data review and begin building simple, interactive tools that help communities quickly understand what's in the air they breathe.

Air Toxics Monitoring

CARB currently supports a network of several stationary air toxics monitoring stations (see map below). While these sites provide important information, they cannot fully characterize air toxics conditions across a state as large and diverse as California.

Community air monitoring has expanded in response to community concerns and legislative direction,[31] but additional monitoring capacity is needed to understand local conditions, evaluate trends, and respond to emerging concerns and assess the effectiveness of regulatory programs.

Map of CARB Monitoring Stations



Improving How We Communicate and Share Information

CARB and partner agencies also need to rely more on plain-language communication that bridges the gap between complex science and the public. Translating this information into clear, accessible messages that educate, counter misinformation, and empower the public, are an important goal of this effort.

[31] As a result of AB 617 (2017), *Community Air Monitoring* plans are developed to support emission and exposure reductions. Other community monitoring initiatives include the *Study of Neighborhood Air near Petroleum Sources*, and the *Statewide Mobile Monitoring Initiative*.

IV. Science is Not Keeping Pace with Risk Identification and Reduction Needs

As health science advances, new information continues to emerge about chemicals that may cause cancer or other serious health effects. Some of these chemicals are already present in California's air, used in common products or industrial processes, or formed as byproducts of everyday activities, such as combustion. In some cases, these risks are newly identified. In other cases, the concern has existed for years, but science has only recently advanced enough to better quantify potential health impacts.

Air Toxics Monitoring

Risk assessments are usually based on emissions inventory or air monitoring data. For the latter, current assessments must rely on limited air monitoring data with known limitations and notable uncertainties. Measuring air toxics in outdoor air can also present significant technical challenges compared to our longstanding methods for measuring ozone or particulate matter. Research has shown that some toxic chemicals can form or degrade inside the canisters used to collect samples. They can also undergo chemical reactions that make sampling and analysis inaccurate or unreliable. These uncertainties become even greater when attempting to measure concentrations that are very low or approach the monitor's detection limits. Although advanced air monitors can measure some air toxics continuously, they can also be affected by interference from other gases in the air leading to inaccurate results. There are also air toxics for which we don't currently have measurement methods. Those methods would have to be developed before we could monitor them.

Emissions Inventory

There are also uncertainties in our emissions inventory data. Although many potential sources of air toxics are known, the amount each source emits is not always well understood. Historically, CARB has developed and periodically updated a comprehensive California Toxics Inventory (CTI)[32] for all sources across the state: stationary (facilities), mobile, areawide, and natural. This inventory relied on tools, such as emission factors and chemical profiles, that were intended for ozone modeling and not specifically for air toxics. Many of the chemical profiles used in these tools were created decades ago and no longer represent how facilities operate today or the full range of air toxics we now expect to see. In addition, CARB has documented data quality concerns with source test methodologies that were used to

[32] CARB, *California Toxics Inventory*.

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estimate key air toxics, such as acrolein. Without updated and accurate emissions data, it becomes harder for California to identify the most important sources, understand the risks they pose, and develop effective strategies to reduce harmful emissions.

Health Guidance Value Development

Risk assessments also rely on the availability of health guidance values from OEHHA.[33,34] Health guidance values are used to determine the exposure levels at which specific air toxics can harm health. Under the AB 2588 "Hot Spots" Program, the OEHHA health values are used by facilities and Air Districts to screen and prioritize permitted and unpermitted facilities for further review and action based on their potential health impacts. If a facility is designated as high priority, the OEHHA health values are then used to determine if a risk is posed to the surrounding community by conducting a health risk assessment.[35]

Conventional toxicity test methods used to generate data for determining health guidance values have historically relied on expensive, lengthy testing, which is not always available. Of the more than 1,900 air toxic compounds on CARB's expanded reporting regulation list under EICG, there are nearly 1,500 compounds for which facilities are required to report the amount they emit. Of that 1,500, only 21% have an OEHHA-approved health value. While OEHHA works continuously to establish new health guidance values, the process is lengthy and resource intensive. They currently have the capacity to add or update about 1 or 2 health values every year – which is not keeping pace with the expansive and growing list of toxic pollutants that are known to cause harmful health impacts. OEHHA has been exploring strategies to help address this issue by evaluating newer, innovative approaches to expedite the development of health guidance values for air toxics.

V. Authorities and Responsibilities to Address Risk are Distributed Across Multiple State and Local Agencies

As discussed above, there are a variety of state and local agencies that are responsible for regulating the release of air toxics. California's Air Districts have played an important role in reducing the impact of air toxics since the inception of the

[33] OEHHA (2009) *Technical Support Document for Cancer Potency Factors*.

[34] OEHHA (2008) *Technical Support Document for the Derivation of Noncancer Reference Exposure Levels*.

[35] OEHHA (2015). *Air Toxics "Hot Spots" Program Guidance Manual for the Preparation of Health Risk Assessments*.

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"Hot Spots" Program, and, in many cases, have maintained and advanced the science and risk reduction efforts. Their responsibilities include developing regulations, issuing permits, implementing the Hot Spots Program, and conducting air monitoring to measure toxic concentrations. Some examples of work by Air Districts include developing regulations and control measures that address industrial combustion equipment, power generation facilities, stationary engines, agricultural burning, residential wood burning, commercial cooking operations, open burning, and other stationary and area-wide combustion sources.

At the same time, no single agency holds all of the information, expertise, or authority needed to address every air toxics issue. Data collection, technical expertise, and regulatory authority are distributed across multiple state and local agencies. Because no single agency holds all the necessary tools or information, effective control strategies depend on close coordination, shared planning, and clear communication among agencies. For example, a facility's emissions may fall under one agency's permitting authority, while the air quality impacts of those emissions are tracked by a different agency entirely, and the chemical's health risk thresholds are set by a third. Each agency may be carrying out its responsibilities correctly, yet the community living in areas where there may be gaps in authority can still experience disproportionate impacts, not from a single agency's failure, but from the seams between agencies' reach, where no single entity holds full authority or visibility over the cumulative impacts.

Strong, collaborative partnerships are needed to ensure that data gaps can be addressed more efficiently, roles and responsibilities are aligned, and actions across jurisdictions reinforce rather than duplicate one another. Closing this gap would include agencies proactively sharing information, monitoring results, emissions inventory data, coordinating permitting and regulatory activities where appropriate, and jointly translating scientific findings into actionable pathways to resolve those gaps between authorities.

VI. Policy Implementation has not Evolved with Today's Risk Challenges

The policies needed to address risk from emerging air toxics are also not keeping pace or evolving to meet today's challenges. California's process for formally identifying Toxic Air Contaminants includes important scientific review and public input, but it can take significant time and resources. Formal identification establishes a formal statewide basis and is a necessary step before CARB can consider developing an ATCM through the traditional AB 1807 process. Although

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identification does not necessarily lead to a control measure, delays in the process can make it harder for the agencies to evaluate and respond to emerging risks.

While the AB 2588 "Hot Spots" Program was groundbreaking when it was adopted in 1987, over time the program has not evolved to meet changing times or scientific advancements. For example, if the public is to be notified of nearby risks, the program dictates that it be done with a letter to individual neighbors or with a newspaper notification.[36] In addition, when the "Hot Spots" program was initiated, the Air Districts were intentionally given authority to set policies for its implementation, allowing them to adapt to local situations. However, now that the program has matured, it could be beneficial to establish statewide baselines to complement local policies.

Permitting programs are also impacted by the increasing number of new chemicals and sectors being evaluated. This poses a resource challenge for local and state air agencies and facilities, and Air Districts may face difficult permitting decisions if facilities cannot meet health-protective thresholds without costly solutions.

Multiple environmental stressors contribute to disparities in health outcomes, which are often greatest in communities that already face environmental justice concerns. Current air toxics control strategies often only focus on a single air pollutant, source, or facility at a time. However, communities often experience exposure from multiple pollutants and sources, and other environmental stressors at the same time. Assessing those combined impacts is complex, but necessary to understand overall community exposure risks, and allows us to identify where emission reduction strategies are most needed.

Modernizing the "Hot Spots" program will be essential to strengthening public health protections and ensure that Air Districts and CARB can respond to existing and emerging air toxics with the speed and rigor today's science requires.

CASE STUDY – AUTOBODY SHOPS

Autobody shops can help illustrate why California needs a strong, robust and coordinated Air Toxics Program, and offers insights into some of the unique challenges encountered with air toxics.

[36] CARB, *"Hot Spots" Public Notification.*

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Autobody shops specialize in repairing vehicles by addressing paint and body damage from scratches, dents, and collisions. The paints and coatings used in these facilities can generate odors and emit air pollutants, including particulate matter, volatile organic compounds (VOCs), and toxic air contaminants, into surrounding neighborhoods.

Two air toxics from autobody shops that will be discussed here are parachlorobenzotrifluoride (PCBTF) and a group of chemicals known as isocyanates. PCBTF became widely used in automotive coating formulations after the United States Environmental Protection Agency excluded it from the federal definition of a volatile organic compound (VOC) for ozone control purposes in 1994. Using PCBTF helped manufacturers meet stricter VOC limits. But in 2020, PCBTF was recognized as carcinogenic and OEHHA adopted an Air Toxics "Hot Spots" cancer inhalation unit risk factor for PCBTF, making it possible for Air Districts to estimate cancer risk under the AB 2588 "Hot Spots" Program. However, it has not been identified by CARB as a formal TAC, which is necessary for developing state regulatory actions such as ATCMs. South Coast Air Quality Management District is actively phasing out and prohibiting the use of PCBTF at autobody shops through local regulatory action.

Isocyanates are another key ingredient in automotive coatings and are a health concern.[37,38] Unlike PCBTF, several isocyanates used in automotive coatings are already identified TACs in California and have OEHHA-approved health values. But identifying which actions to take has been challenging due to resource challenges and technical issues. In coating systems, isocyanates act as hardeners. They help clearcoats and other finishes cure into durable, weather-resistant surfaces. However, the same chemical reactivity that makes isocyanates effective in these coatings also make them harmful to health. Exposure to isocyanates can lead to respiratory sensitization, meaning that once a person is sensitized to it, even minimal exposure can trigger asthma attacks.[39]

New emissions reporting requirements through the Criteria Air Pollutants and Toxic Air Contaminants Reporting (CTR) Regulation and the Emission Inventory Criteria and Guidelines Regulation (EICG) are bringing more autobody shops into view and providing important information about the products shops use, the emissions they

[37] Center for Disease Control, *NIOSH Isocyanates*.

[38] OEHHA, *Hexamethylene Diisocyanates (Polydiisocyanates)*.

[39] OEHHA, *Technical Support Document for the Derivation of Noncancer Reference Exposure Levels, Hexamethylene Diisocyanate* (Sept. 2019).

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may generate, and the health risks they may pose. But once potential risks are identified, the work becomes more complicated. Air Districts may need to evaluate risks, notify nearby residents, require risk reduction, or make difficult permitting decisions. Early information from Air Districts suggests this could create a significant workload, especially in areas with many autobody shops or more health-protective risk thresholds.

Small businesses may also face challenges. Many shops do not have environmental staff, systems for tracking chemical use, or easy alternatives to the products they currently use. In some cases, reducing risk may require changes to coating use, product formulations, or pollution controls. This example shows why better reporting is important, but not enough on its own. Turning new information into real risk reduction requires clear tools, Air District capacity, business assistance, and practical implementation pathways.

These concerns become greater when autobody shops are located close together or in communities that already face pollution from other sources. In addition to permitted autobody shops, there are also unpermitted or unlicensed operations that use the same or similar products but are unlikely to be reported to CARB or the air districts. These operations may also conduct coating activities without meeting the health-protective control requirements established by Air Districts. This makes it harder to understand the full extent of community exposure and reinforces the need for better source information, Air District support, and practical pathways to reduce risk. Also, AB 617 demonstrates that community-driven monitoring, emissions-reduction planning, and engagement-first processes can surface air toxics concerns that traditional regulatory frameworks may overlook. Elevating these lessons could help modernize policy implementation so it better reflects today's risk challenges and supports earlier, community-prioritized emission-reduction strategies.

Our Path to Success

CARB is responsible for developing and implementing regulations and strategies that protect public health and improve air quality. Communities rely on CARB and Air Districts to provide strong oversight, transparent, accessible data, and consistent tools for reducing their risk of exposure to air toxics.

Toxic air pollution often has very local impacts. In many communities, especially those already facing environmental justice concerns, nearby sources of toxic air pollution contribute to cumulative exposure from multiple pollutants and multiple source

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types. These patterns are often shaped by long-standing land-use disparities, including the placement of homes, schools, workplaces, and community spaces near industrial facilities, transportation corridors, and other pollution sources. As a result, disadvantaged communities often face a disproportionate pollution burden.

This Roadmap provides a statewide planning strategy to connect scientific findings to actions, including regulations (ATCMs), guidance, technical tools, and other emission reduction strategies, supported by coordination with other agencies, Air Districts, communities, tribes, industry, academia, and the public to increase efficiency and build robust partnerships. This is intended to ensure every community receives equitable levels of scientific rigor, clear information, and health-protective action.

To achieve our mission of reducing exposure to toxic air pollution statewide, CARB will need resources and sustained partnerships to:

- Strengthen coordination with Air Districts and other agency partners
- Build and maintain relationships with communities, tribes, academics, industry, and other stakeholders
- Strengthen the scientific foundation for air toxics work
- Prioritize emerging air toxics of concern
- Increase data transparency and public access to information
- Modernize existing programs under AB 2588 and AB 1807
- Develop policies and methods to evaluate and address cumulative risk from ambient exposures
- Research and develop emissions reduction strategies

These strategies will allow CARB to make consistent progress over time and complement existing efforts from other agency and community partners to reduce air toxics emissions and exposures at the local level. This path to success will position CARB to act earlier, more effectively, and with greater scientific confidence as new air toxics emerge, protecting public health today and for future generations.

CARB's Roadmap aims to reestablish a stronger, more unified, and more proactive Air Toxics Program that identifies the pollutants that pose the greatest health risks, closes critical scientific gaps, and acts to reduce and prevent harm to communities. The goal is to move from today's fragmented and reactive approach toward one that is strategic, coordinated, efficient, and grounded in shared scientific understanding. Strengthening state and air district capacity will be essential to fulfilling the vision outlined in this Roadmap.

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I. Strengthen Coordination with Air Districts and Other Agency Partners

Air Districts

California's 35 local Air Districts co-regulate air toxics emissions alongside CARB. Air Districts are responsible for regional air quality planning, monitoring, stationary source permitting, and many local implementation activities, including community air protection under AB 617. They also administer air quality improvement grant programs. Strengthening coordination with local Air Districts can reduce reactive, crisis-driven responses, support smaller and rural districts, improve the reliability of data informing public decisions, and give communities, facilities, and districts greater confidence in programs such as AB 617 and AB 2588.

CARB's success depends on working closely with our Air District partners. A modern, effective Air Toxics Program requires shared ownership, shared strategy, and shared accountability because no single agency can protect communities from emerging risks on its own. Air Districts bring local knowledge and on the ground experience, while CARB can provide baselines, scientific expertise, and a broader regulatory framework. Stronger coordination and early engagement can help align methods, streamline implementation, and support science-based health protections across California. Together, CARB and the Air Districts can build an air toxics program that is more responsive, more equitable, and more trusted by the public. Strong coordination is essential to delivering the level of protection Californians deserve.

Other Agency Partners

Other local (agricultural commissioners, city governments, etc.), state (OEHHA, DTSC, DPR, etc.), and federal (U.S. EPA) partners bring important authorities, data, expertise, and community relationships to air toxics work. CARB will strengthen coordination with all of these partners, so roles are clearer, work is less duplicative, and decisions are based on the best available information. This enhanced collaboration will also help address gaps that arise across agency authorities, such as data limitations and shared decision-making challenges, by ensuring these issues are identified and resolved collectively.

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II. Build and Maintain Relationships with Communities, Tribes, Academics, Industry, and Other Stakeholders

Communities

Communities bring direct experience with local air quality concerns, exposure patterns, and the cumulative burdens that may not be fully captured by statewide data alone. CARB will continue to work with communities to better understand local concerns, improve risk communication, and ensure that air toxics priorities and actions are informed by the people most affected. Much of this work is done in an ongoing way through AB 617, where CARB and Air Districts partner with community steering communities to develop plans to address neighborhood-level pollution problems in the most overburdened areas of California. We will integrate CARB's Community Engagement Model and Equity Lens throughout the Air Toxics Program to improve and standardize inclusion of community voices. CARB will also leverage the lessons learned and partnerships established through the CAPP and informed by the community-identified air quality priorities included in CERPs. AB 617 demonstrates that community-driven monitoring, emissions-reduction planning, and engagement-first processes can surface air toxics concerns that traditional regulatory frameworks may overlook. Elevating these lessons could help modernize policy implementation so it better reflects today's risk challenges and supports earlier, community-prioritized emission-reduction strategies.



Images source: CARB media library

Tribes

Tribal governments and tribal communities bring important knowledge and place-based perspectives to air toxics work. CARB will continue to strengthen coordination with tribes to better understand tribal concerns and priorities, respect sovereignty, further deepen government-to-government relationships, and ensure that air toxics strategies consider tribal lands, cultural knowledge and resources, subsistence practices, and community health.

Academics

Academic and research partners help advance the science needed to understand emerging air toxics, exposure pathways, monitoring methods, emissions sources, and

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health impacts. CARB will continue to work with academic partners to fill key science gaps, evaluate new methods, and support research that improves the State's ability to identify, prioritize, and reduce air toxics risks.

Industry

Industry partners have important information about products, processes, emissions, control technologies, and implementation challenges. Because many risk-reduction strategies will ultimately be carried out at regulated facilities, CARB will work with industry to improve emissions data, understand technical feasibility, identify safer alternatives where available, and develop practical strategies that protect public health while recognizing real-world costs and implementation needs.

Other Stakeholders

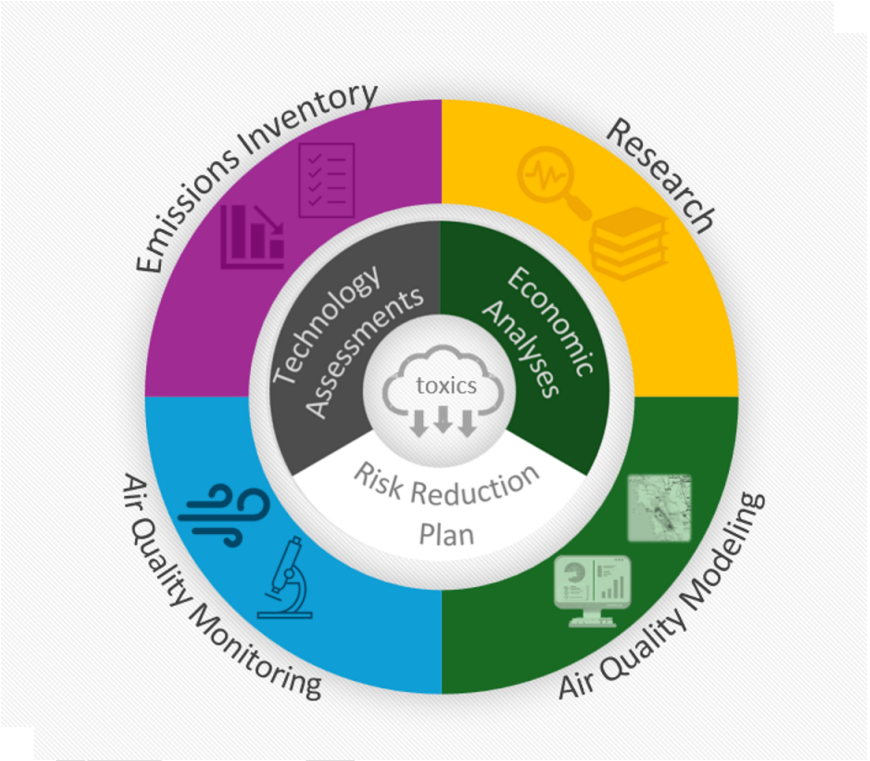
There are many stakeholders that play a role in cleaning California's air. CARB is committed to working with any and all individuals and groups that are impacted by air quality in this State.

III. Strengthen the Scientific Foundations for Air Toxics Work

A strong scientific foundation is essential to accurately identify exposures and take decisive, effective action. Monitoring, emissions inventory, modeling, and research are tools that each play a critical role in understanding what communities face and where action is most urgently needed.

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None of these tools can fully characterize risk on their own. Monitoring provides real-world information about what is in the air, but it is resource-intensive and cannot cover every community, especially in a state as large and diverse as California. Air toxics also vary from place to place, making it difficult for monitoring alone to fully capture this variation or determine how much each source contributes. Emissions inventories help identify which sources are releasing air toxics, which pollutants are being emitted, and where those emissions may be occurring. Modeling helps connect emissions inventory and monitoring data to potential exposure by estimating how pollutants move through the air and where risks may be highest. Research helps strengthen the methods, data, and assumptions behind monitoring, inventory, and modeling. The figure shows how core scientific tools, including emissions inventory, monitoring, modeling, and research, support the analyses and planning needed to reduce air toxics risk.



To succeed, monitoring, the emissions inventory, modeling, and research all must operate as a coordinated system. Better emissions inventories improve models. Monitoring data helps validate and refine those models, and models help fill geographic and temporal gaps where monitoring is not available. Research helps strengthen the methods and data behind emissions inventories, monitoring, and modeling. Together, these tools provide the scientific foundation for technology assessments, economic analyses, and risk-reduction planning. This allows CARB to evaluate more areas of the state, identify emerging problems earlier, support communities and local Air Districts with consistent information, and ensure Californians benefit from an equitable, science driven strategy to reduce air toxics risk.

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Monitoring

California's air toxics monitoring system must evolve to keep pace with modern challenges and community expectations. For example, many pollutants appear at or near the limit of detection in the regional network, yet emissions inventory data, source tests, and community experience indicate that risks persist. A stronger monitoring program is needed to understand long-term trends, improve exposure assessments, evaluate air quality models, and respond to emerging air toxics concerns.

This includes optimizing the statewide air toxics monitoring network, expanding community-driven and mobile monitoring, and using advanced technologies to measure pollutants that are difficult to characterize with traditional methods. Rapid deployment tools are also important so CARB and its partners can respond more quickly during emergencies, accidental releases, wildfires, and other unexpected events.

Because monitoring needs differ across the state, success depends on close collaboration with Air Districts, academic partners, and community organizations that bring local expertise and lived experience. CARB intends to strengthen the monitoring system so it can be more targeted, adaptable, and responsive to emerging air toxics concerns, community priorities, and emission reduction needs. Rather than relying only on fixed monitoring locations, a stronger system should help CARB and its partners evaluate trends, investigate areas of concern, measure progress, support regulatory and risk-reduction decisions, and communicate results through tools that are transparent, accessible, and useful to the public.

Community monitoring provides long-term, neighborhood-scale surveillance that complements the regional network and helps identify pollutants that may not be captured by routine monitoring. Strengthening collaboration with district-supported monitors, and ensuring that their data is transparent and accessible, would provide meaningful benefits to all stakeholders. Community science can also play a key role by elevating local concerns, identifying potential hot spots, and guiding where additional monitoring is needed. Statewide efforts such as the Statewide Mobile Monitoring Initiative[40] and deployment of near real-time analyzers further support community-focused monitoring by providing flexible tools to investigate concerns, validate inventory assumptions, and respond quickly to emerging issues.

[40] CARB, *Statewide Mobile Monitoring Initiative*

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Emissions Inventory

A strong Air Toxics Program relies on a transparent, science-based emissions inventory that clearly identifies what is emitted, where it is emitted, and in what amounts. This information is essential for understanding potential sources of risk, supporting air toxics and health risk modeling, identifying priorities, and developing effective reduction strategies.

Today, key elements of California's air toxics emissions inventory rely on outdated emission factors and older chemical profiles. Many of these tools were originally developed for ozone modeling rather than air toxics, which leads to uncertainty for many pollutants, especially new air toxics of concern such as acrolein, ethylene oxide, PCBTF, and isocyanates. As new air toxics concerns emerge, these uncertainties can limit CARB's ability to identify the sources that matter most and determine where action is needed.

Rebuilding the California Toxics Inventory is essential. CARB intends to update emission factors through expanded source testing and modernized chemical profiles used to estimate toxic emissions. CARB also intends to continue improving the reporting programs and data systems used to collect, manage, and share emissions information. This includes CTR, EICG, and the Integrated Multi-Pollutant Emission Inventory System (IMPEI), which helps manage emissions data. These improvements will produce a scientifically defensible, publicly accessible inventory that communities, Air Districts, and policymakers can rely on to make informed decisions and support future regulatory actions.

Modeling

Air toxics modeling helps CARB understand where pollutants may travel, where exposures may be highest, and how risks may vary across communities. Modeling is especially important because monitoring cannot cover every location, and emissions data alone do not show how pollutants move through the air or how people may be exposed.

Strengthening modeling capabilities will support statewide efforts such as the California Air Toxics Assessment (CATA), support local programs under AB 617 and AB 2588, inform regulatory and risk reduction strategies, and improve analyses of cumulative burden across multiple pollutants and sources. Improved modeling can also help evaluate whether regulations and other emission strategies are effectively reducing risk over time.

CARB intends to develop a modeling framework that uses reliable emissions inventories, high-quality monitoring data, and improved modeling tools. These tools

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may include source apportionment methods, gridded inventory development, more refined spatial information, and emergency response modeling. With these improvements, CARB can better characterize risks in areas without sufficient monitoring coverage, identify emerging problems earlier, support cumulative impact assessments, and track progress over time. A fully integrated modeling framework ensures the state delivers the credible, actionable science needed to protect public health and advance environmental equity.

Research

Research helps CARB strengthen the scientific foundation of the Air Toxics Program. It supports monitoring, emissions inventories, health risk assessment, and modeling by improving methods, filling data gaps, and helping CARB understand how toxic pollutants are formed, emitted, measured, transported, and reduced. Research also helps us to better understand the health effects of toxic chemicals, including cancer, and improves our ability to evaluate cumulative impacts.

Research can also help CARB address emerging air toxics more effectively. It can improve monitoring methods, update emission factors and chemical profiles, refine modeling assumptions, and advance understanding of health risks for emerging air toxics specifically. Research also helps identify where current data or tools are uncertain, which allows CARB to target future work to where information is most needed.

CARB will continue working with its partners to identify priority research needs and apply new findings to real-world air toxics work. For example, OEHHA is developing a variety of approaches to expedite the development of health guidance values, including research on New Approach Methods (NAM) to deal with chemicals that lack conventional toxicity test data. This will help ensure that future decisions are based on the best available science and can support risk reduction, public communication, and more equitable health protection.

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IV. Prioritize Emerging Air Toxics of Concern

As scientific knowledge and chemical use evolve, some pollutants are identified as potentially posing greater risks than previously understood. These pollutants are referred to as emerging air toxics.

Emerging air toxics include air toxics that have:

- Newly identified toxicities not previously understood, including quantified health values;
- Recently detected in the environment through air monitoring studies and usage
- Recently found to be accumulating in the bodies of humans identified through biomonitoring studies

Emerging air toxics should be identified early, evaluated with scientific rigor, and addressed transparently to proactively protect Californians. CARB aims to collaborate with all impacted parties, including communities, tribes, industry, Air Districts, and other government agencies, throughout the process of addressing emerging air toxics of concern.

CARB is in the early stages of developing an air Toxics Decision Framework to address and prioritize emerging and pre-existing air toxics of concern. Addressing these concerning air toxics can take many forms, including but not limited to developing regulations, increasing community air monitoring, or prioritizing chemicals for health value development. The framework will be developed through a transparent public process so that everyone with a stake in clean air can help shape how it is designed and used. The framework will provide a more consistent method for evaluating air toxics information, prioritizing pollutants and source categories, and identifying appropriate actions to reduce exposure. It will also help CARB explain decisions more clearly, use resources more effectively, and ensure accountability.

Recent collaboration on new health values for ethylene oxide and acrolein shows what is possible: early engagement of technical experts, faster scientific review, and meaningful community involvement that builds trust, transparency, and public understanding of both risks and regulatory processes. In addition to developing the air toxics decision framework, CARB will continue to work with the Air Districts to develop statewide plans for acrolein and ethylene oxide.

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V. Increase Data Transparency and Public Access to Information

Data transparency is one of the most powerful tools we have for protecting communities. California's Air Toxics Program will succeed only if people can clearly see, understand, and use air quality and emission data. All the information used to better understand California's air quality must be made accessible so that the information is clear and actionable, ensuring inclusive decision-making for public health protection.



Images source: CARB website

CARB aims to modernize our emissions visualization and facility search tools to meet today's expectations. Communities need more than raw numbers; they need accessible storytelling, plain language explanations, and granular, neighborhood-level insights that reveal how different sources combine to shape local air quality. Updating CARB's Pollution Mapping Tool[41] and Facility Search Tool[42] can help turn complex datasets into information that is easier to understand and use. These tools can support local source identification, cumulative burden analysis, evaluation of emerging air toxics, and coordination across programs such as AB 2588, AB 617, and AB 197.

These tools will also help communities, tribes, Air Districts, industry, and other partners work from a shared understanding about where pollution sources are located and where cumulative burdens are experienced. These modernized tools will provide intuitive access to information that everyone has a right to know, including multilingual communities. This shared understanding is essential for building trust and supporting informed action.

VI. Modernize Existing Programs Under AB 2588 and AB 1807

CARB has authority to address air toxics. However, some of CARB's statutory authorities may need to be updated or clarified to meet today's challenges. Making

[41] CARB, *Pollution Mapping Tool*.

[42] CARB, *Facility Search Tool*.

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meaningful progress will require CARB, Air Districts, industry, and community partners to work together to identify where additional or clarified authority is needed or appropriate and determine the best path forward if updates or clarifications to the authorities are required.

AB 2588

California's Air Toxics Program was groundbreaking when AB 2588 launched in the late 1980s. Despite still being one of the strongest programs in the nation protecting public health from toxic air pollution, the program now faces challenges that were not fully anticipated. In its current form, AB 2588 focuses on emissions from a single facility at a time. This limits its capacity to account for people's exposure where industrial, traffic, and other pollutant burdens overlap. In addition, the state of chemical science has advanced significantly, resulting in a new challenge, the rise of regrettable substitutions. The number of air toxics listed in our regulation and require reporting is being outpaced by the science, resulting in chemicals being used as replacements only to later reveal serious health and environmental hazards. These items in combination with an increased workload that exceeds CARB's capacity, have created a need to modernize the program and statutory requirements. Modernizing AB 2588 will improve efficiency, consistency, strengthen public health protections, and ensure Air Districts and CARB can respond to emerging air toxics with the speed and rigor that today's science demands. CARB will work with Air Districts and industrial and community partners to update the Program, enhance statewide consistency, streamline outdated requirements, and strengthen public notification and risk reduction processes so every community receives equitable protection

Key opportunities include improving how industrywide inventory and prioritization results are shared with CARB, updating the "Hot Spots" fee regulation to clarify data reporting elements, expanding OEHHA's consolidated health tables for better information sharing, improving enforcement, and revising notification guidelines to reflect modern science and technology and community expectations.

The "Hot Spots" Program already contains the core tools needed to address emerging air toxics: identifying new compounds, understanding sources, evaluating risk, and ensuring transparent public communication. By modernizing the parts of the Program that no longer reflect current science or implementation needs, California can build a more credible, consistent, equitable, and protective Program.

AB 1807

Streamlining the formal TAC identification process is one of the most powerful steps California can take to modernize AB 1807 and respond more quickly when new

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health science becomes available. Under the current process, CARB must complete a resource-intensive identification process for each compound before developing statewide control measures, even after OEHHA has already pursued a rigorous public and scientific process to develop health values for the chemical.

There are options that may streamline this process. Within CARB's existing authority, we can investigate ways to shorten the steps that are currently required. Another potential modernization option is a legislative amendment to automatically identify any EICG Appendix A chemical with an OEHHA health value as a TAC.[43] Such an amendment would create a more predictable, science-based pathway for moving from credible health information to potential action. It would also shorten delays, reduce duplicative reviews, and help communities, especially those already facing high cumulative burdens, receive faster protection from chemicals known to pose health risks.

By furthering scientific rigor and aligning practical lessons learned from AB 2588 to AB 1807, California can build an identification process that is more responsive, more efficient, more equitable, and better equipped to act on emerging threats. It is important to note that many parties play critical roles in the TAC identification process. As a result, CARB will work with all applicable partners regarding this process including OEHHA, DPR, the Scientific Review Panel[44], and the public.

VII. Develop Policies and Methods to Evaluate and Address Cumulative Risks from Ambient Exposure

Multiple environmental stressors contribute to place-based disparities in health outcomes. These burdens are often greatest in communities that already face environmental justice concerns, including many disadvantaged communities and communities of color.

Many current air toxics strategies focus on a single air pollutant, source, or facility at a time. But communities often experience exposure from multiple pollutants, multiple facilities, mobile sources, and area-wide sources at the same time. Assessing those combined impacts is complex, but necessary to better understand community risk. Assessing cumulative risk allows us to identify where emission reduction strategies are most needed and which approaches are likely to be the most effective.

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[43] CARB, Emission Inventory Criteria and Guidelines Report (Sections I–XI), *Appendix A: List of Substances*, published 2022.

[44] CARB, *Scientific Review Panel on Toxic Air Contaminants*.

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CARB recognizes the importance of working with our partners to develop policies and procedures to assess cumulative exposure to air toxics and integrate them throughout the Air Toxics Program. This work will build on existing definitions, screening tools such as CalEnviroScreen, and lessons learned from other agencies and jurisdictions, including local Air District. It will also include research that supports method development for assessing statewide health impacts from multipollutant ambient exposures, expanded health analysis, and community-scale assessments of health effects from exposures to air toxics.

As these policies and procedures develop, CARB will work with partner agencies, communities, Air Districts, tribes, industry, and other partners to evaluate and pilot new information and tools. Over time, these tools can help CARB evaluate air quality issues more holistically, prioritize actions in communities with the greatest cumulative burdens, and better track whether emission reduction strategies are improving public health.

VIII. Investigate and Develop Voluntary Emissions Reduction Strategies

Traditionally, CARB has largely relied on adopting ATCMs to reduce risk from air toxics. ATCMs are regulations that require emissions reductions and are based on authority that has been given to CARB by state law. Although ATCMs have been very effective at reducing air toxics, the rulemaking process that we are statutorily required to use to create them is time consuming. In order to reduce toxic emissions in a timely manner, we are going to explore other possible ways to get those reductions where appropriate. These could include approaches like:

New Control Technologies

Throughout the years, many new control technologies have been developed in response to CARB's ATCMs and other regulations. However, we need to work closely with our partners to identify and develop new control technologies that could reduce exposure to air toxics proactively and voluntarily, rather than in response to regulations. Working together could help us to reduce emissions of air toxics quickly and without the lengthy regulatory process.

Cleaner Industrial Processes

As with control technologies, working with industry groups to identify, and voluntarily adopt, industrial processes that are cleaner and less emitting could help to reduce emissions of air toxics quickly and without the lengthy regulatory process.

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Voluntary Incentive Programs

We could also bring about emissions reductions indirectly by providing funds to incentivize voluntary reductions. Incentive funding is money that we give to sources. Facilities can use that funding to partially offset the cost of changing to a less polluting option. In order to receive this money, applicants have to prove that they meet the requirements that are specific to the incentive fund. We could also work to identify incentive funds that can be used to offset the cost of adopting cleaner technologies. There are already examples of this path being used to reduce criteria pollutants. We may be able model these programs and apply their lessons to reduce air toxics.

Our Next Steps

California is taking action on air toxics at a moment when federal protections for toxic air contaminants are being weakened by federal regulatory rollback of national clean air policies. As federal standards become less protective, California must rely more on its own well-grounded scientific expertise to protect our communities. Strengthening state capacity will be essential to fulfilling the vision outlined in this Roadmap.

I. Early Action Items

Our Path to Success includes many actions, each with its own timeline. Some of them can be accomplished in the near future, while others may take several years to complete. Early action items that can be immediately initiated will set the tone for the efforts that follow. CARB's resource constraints are a limiting factor in how soon we can take action and how quickly we can achieve our goals.

Partner Engagement

CARB's relationships with our partners are mission critical. While CARB staff have been actively engaging with community groups, Air Districts, and other partner agencies to collaborate on specific projects or program goals, collaboration could be done in a more coordinated way to improve effectiveness and efficiency. Over the next year, CARB will initiate a process to increase and improve engagement with all our partners.

Statewide Plans for Acrolein and Ethylene Oxide

As OEHHA works to finalize the draft health values, CARB will spearhead the development of statewide strategic plans to identify appropriate emissions control

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strategies for acrolein and ethylene oxide. CARB will work closely with the Air Districts and our other partners to develop these strategic plans. Recognizing gaps in our current scientific understanding of acrolein and ethylene oxide, the Governor's 2026 budget allocates $2.5 million to support enhanced research to enable these risk reduction strategies. The strategies will be informed by scientific advancements from the planned, targeted research program, along with considerations for technology readiness, regulatory authority, and cost.

II. Other Near-Term Goals

Other near-term goals, outside of the early action items, are foundational to the revitalization of the Air Toxics Program. We will focus on the near-term goals listed below after we have advanced the early actions. While these goals will be initiated early, they will all take time and additional capacity and resources to complete. Strengthening state capacity will be essential to fulfilling the vision outlined in this Roadmap, including supporting our partners with the resources needed to implement these efforts effectively.

Air Toxics Emissions Inventory

To assess cumulative risk and population-wide exposures, it's important that we have a clear and accurate understanding of the air toxics emitted from all sources in California. We need to improve our emissions inventory to ensure it's robust, accurate, and reliable and able to accurately estimate the risk from all sources of air toxics. With additional capacity, CARB would be able to initiate a comprehensive rebuild of the California Toxics Inventory by updating outdated emission factors through expanded source testing, modernizing chemical speciation profiles to better reflect current toxic pollutants and improving quality assurance of reported facility data by reviewing expected pollutants in each source category and their expected ranges. Refining the emissions inventory will begin with addressing pollutants of the greatest concern first.

Cumulative Health Risk Evaluation

To make meaningful progress toward reducing the combined impacts of all the air toxic emissions that individual communities are exposed to, CARB intends to start by developing policies, guidelines, and procedures for how to model the health impacts from all the sources of air toxics in a community. We also need to develop methods to measure the health benefits of reducing combined air toxic emissions. These efforts will allow us to make more informed decisions about which air toxic emissions have the greatest impact on health.

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Prioritizing Our Efforts

An accurate emissions inventory and the ability to use that data to model the cumulative impacts of air toxics in communities, will allow us to more effectively prioritize our efforts, make more progress, and take action where it matters most.

Prioritizing where to focus our efforts is not simple. We need to develop an effective and transparent method for prioritizing our efforts so that all our partners are on the same page and understand why we are doing things in a particular order. The method we plan to develop to achieve this is called the Toxics Decision Framework (TDF). CARB will have robust engagement with our partners, including Air Districts, community groups, tribes, industry, and other partner agencies during TDF's development to ensure that their unique experiences, expertise, and perspectives are included.

Conclusion

CARB's Air Toxics Program plays a critically important role in improving the health and wellbeing of all Californians. The need for action is clear, especially when considering the recent rollback of health-based rules and policies at the federal level. We know that as we learn more, there will be previously unidentified concerns that arise and having resources available will be important so that we are prepared to meet those challenges.

This Roadmap outlines a path to reestablishing our necessary role alongside our partners. CARB recognizes the importance of engaging and coordinating with communities, tribes, Air Districts, and other partner agencies. It is only by working together that we can achieve the reductions in air toxic exposure that all communities, but especially overburdened communities, need and have been asking for. CARB is dedicated to bringing about these necessary changes and we invite our partners to travel down this path with us so that we can achieve success.

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