

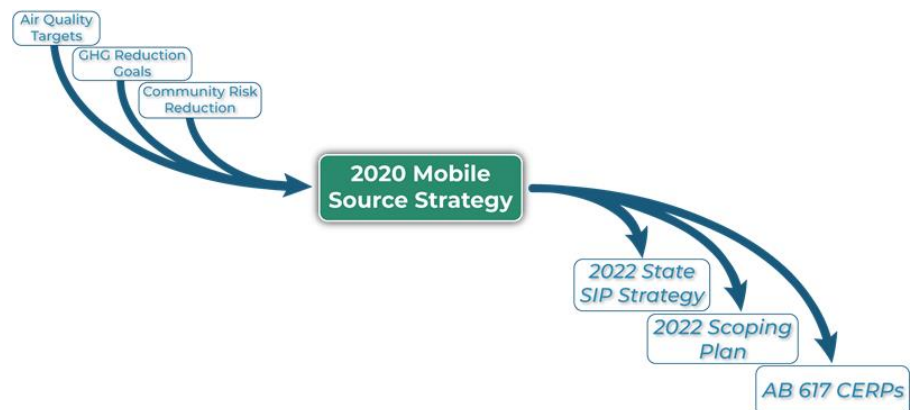
Executive Summary

The *California Air Resources Board* (CARB or Board) *2020 Mobile Source Strategy* (2020 Strategy) uses scenario planning to take an integrated approach to identifying the technology trajectories and programmatic concepts to meet our criteria pollutant, greenhouse gas, and toxic air contaminant reduction goals from mobile sources. California only has one fleet of vehicles and equipment, and it’s imperative that we optimize our mobile source control programs to maximize emissions reductions from all types of air pollutants in order to meet our many goals and provide immediate benefits in the communities that continue to bear the brunt of poor air quality. Similar to the *2016 Mobile Source Strategy* (2016 Strategy), the 2020 Strategy is a framework that identifies the levels of cleaner technologies necessary to meet our many goals and high-level regulatory concepts that would allow the State to achieve the levels of cleaner technology.

The 2020 Strategy will inform the development of other planning efforts including the State Implementation Plan (SIP) which will translate the concepts included here into concrete measures and commitments

for specific levels of emissions reductions, the 2022 Climate Change Scoping Plan (2022 Scoping Plan Update), and Community Emissions Reduction Plans (CERPs) required for communities selected as a part of CARB’s Community Air Protection Program. Central to all of

these planning efforts, and CARB actions on mobile sources going forward, will be environmental justice as CARB strives to address longstanding environmental and health inequities from elevated levels of toxics, criteria pollutants, and secondary impacts of climate change.



CARB has over 50 years of experience reducing mobile source emissions that have improved air quality and reduced climate pollutants. Through these efforts, the State and our most polluted regions have seen dramatic improvements in ambient air quality and, as a byproduct, CARB has helped California become a world leader in environmental policies and clean technologies. Even with our progress, many areas of the State exceed current health-based ambient air quality standards that the State must legally meet; in addition, many near-source, low-income and disadvantaged communities continue to experience disproportionately high levels of air pollution and the resulting detrimental impacts to their health. Further, climate change is causing extreme heat, devastating wildfires, historic droughts, torrential storms, causing billions of dollars in property damage and threatening

human health and the economy of the residents of California – the unprecedented number of acres burned by wildfires in 2020 reemphasizes that climate change is here now. These immediate threats of climate change demand action and have resulted in a number of State of California and CARB policies to date.

Mobile sources including cars, trucks, tractors, and a myriad of other on-road vehicles and off-road equipment, contribute a majority of smog-forming oxides of nitrogen (NO_x), the largest portion of greenhouse gas (GHG) emissions, and are a significant source of toxic air contaminants that directly impact community health. The 2016 Strategy was CARB's first integrated planning effort looking specifically at mobile sources to identify complementary policies to reduce emissions of criteria pollutants, greenhouse gases, and toxics.

In recognition of the value of the 2016 Strategy in relation to the State's ongoing air quality, climate, and community risk reduction challenges, and the ever-evolving vehicle market, the California Legislature passed *Senate Bill (SB) 44*,¹ signed by Governor Newsom into law on September 20, 2019. SB 44 acknowledges the ongoing need to evaluate opportunities for mobile source emissions reductions and requires CARB to update the 2016 Strategy by 2021 and every five years thereafter. Specifically, SB 44 requires CARB to update the 2016 Strategy to include a comprehensive strategy for the deployment of medium and heavy-duty vehicles for the purpose of meeting air quality standards and reducing GHG emissions. It also directs CARB to set reasonable and achievable goals for reducing emissions by 2030 and 2050 from medium- and heavy-duty vehicles that are consistent with the State's overall goals and maximizes the reduction of criteria air pollutants.

This document, the 2020 Strategy, continues this multi-pollutant planning approach to illustrate the pathways forward for the various mobile sectors that are necessary in order to achieve California's numerous goals and targets over the next 30 years. Because meeting all of the State's near- and longer-term goals requires action across the full spectrum of mobile sources, this document also discusses light-duty on-road vehicles, as well as a wide range of off-road equipment sectors.

Last year, Governor Newsom signed *Executive Order N-79-20*² which established a goal that 100 percent of California sales of new passenger car and trucks be zero-emission by 2035. In addition, the Governor's order set a goal to transition all drayage trucks to zero-emission by 2035, all off-road equipment to zero-emission where feasible by 2035, and the remainder of medium- and heavy-duty vehicles to zero-emission where feasible by 2045. With this order and many other recent actions, Governor Newsom has recognized that climate change is happening now, impacting California in unprecedented ways and affecting the health and safety of too many Californians. Under the order, CARB is tasked to work with our State

¹ Skinner, Chapter 297, Statutes of 2019

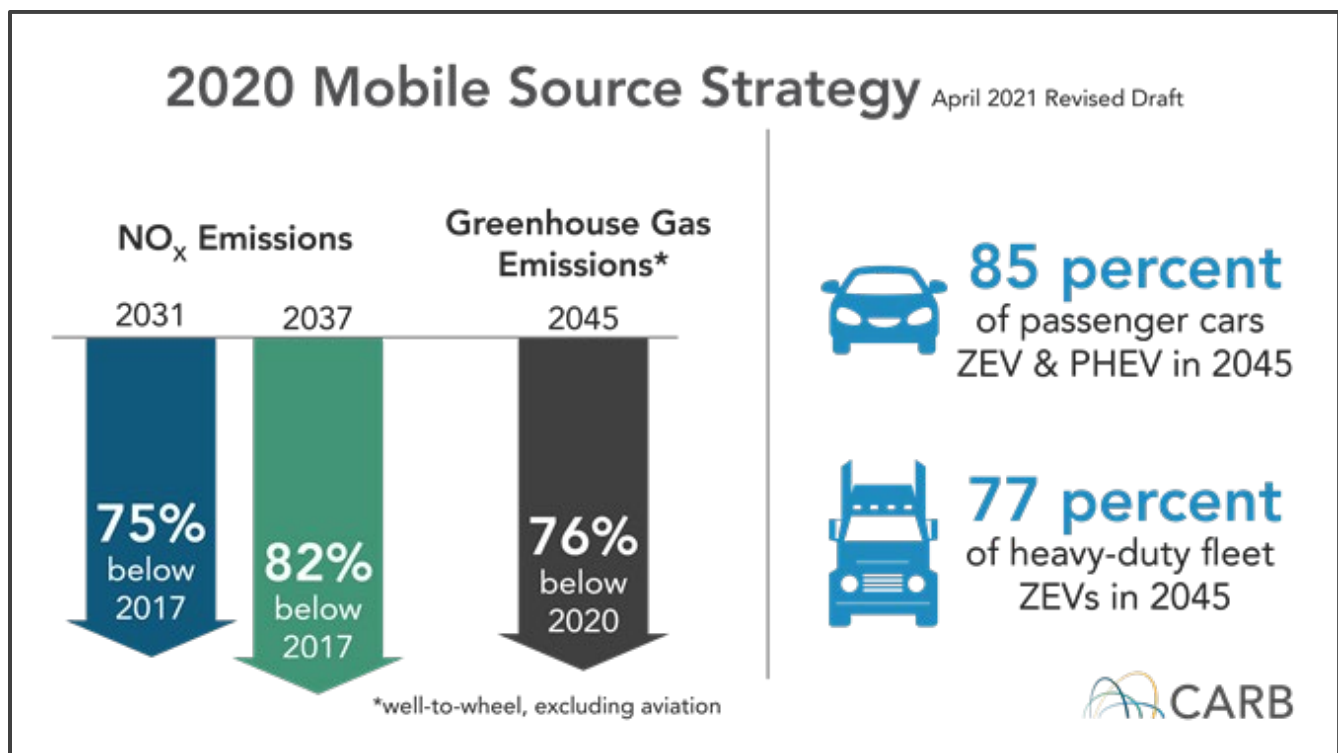
² Executive Order N-79-20 <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

agency partners to develop regulations to achieve these goals taking into account technological feasibility and cost effectiveness.

On April 21, 2021, Governor Newsom joined a bipartisan group of twelve governors from across the country calling for the Biden Administration to build on its early action to tackle climate change by creating a path to ensure that all new vehicles sold in the U.S. will be zero emission in the near future, and by amplifying states’ investments in ZEV charging and fueling infrastructure. The *letter* from the coalition of states calls on the Administration to bolster the clean vehicle transition’s growing momentum nationwide by setting standards to require all new passenger cars and light-duty trucks sold to be zero-emission by 2035 and all new medium-duty and heavy-duty vehicles sold to be zero-emission by 2045, consistent with the pathways that are identified in the 2020 Strategy for California.

2020 Mobile Source Strategy Concepts

Consistent with Executive Order N-79-20 and SB 44, in the 2020 Strategy, staff have identified a suite of strategy concepts, many of which CARB is actively pursuing through individual public processes, that will enable the State to achieve the technology trajectories identified through scenario planning and, consequently, meet California’s many goals.



Further, these concepts maximize the criteria pollutant reductions by going to zero-emission where feasible. Specifically, for medium- and heavy-duty vehicles, the scenarios call for the deployment of approximately 1.4 million medium- and heavy-duty zero-emission vehicles

(ZEVs) in California by 2045. Statewide, the concepts in the 2020 Strategy could achieve criteria pollutant NO_x reductions of over 590 tons per day in 2037, and reduce mobile source fuel consumption by 9.5 billion gallons of gasoline and 3.0 billion gallons of diesel equivalent in 2045. This equates to a well-to-wheel GHG emissions reduction of approximately 94 million metric tons of carbon dioxide equivalent in 2045.

For on-road light-duty vehicles, the 2020 Strategy includes the concepts within the following scope to move the State towards the goal that 100 percent of sales will be ZEVs by 2035:

- Manufacturer requirements to foster clean technology production and sales;
- In-use requirements to accelerate penetration of newer technology;
- Incentive programs to promote and accelerate the use of advanced clean technologies;
- Outreach and education to increase consumer awareness and acceptance of advanced vehicle and equipment technologies; and
- Infrastructure planning and development to support the transition to cleaner technologies.

For on-road medium- and heavy-duty vehicles, the 2020 Strategy includes the concepts within the following scope to move the State towards the goal that 100 percent of California-registered trucks will be ZEVs by 2045 where feasible:

- Manufacturer requirements to foster clean technology production and sales;
- In-use requirements to accelerate penetration of newer technology;
- Incentive programs to promote and accelerate the use of advanced clean technologies;
- Enhanced enforcement strategies to ensure programs are achieving their anticipated benefits;
- Outreach and education to increase consumer awareness and acceptance of advanced vehicle and equipment technologies; and
- Infrastructure planning and development to support the transition to cleaner technologies.

For off-road vehicles and equipment, the 2020 Strategy includes the concepts within the following scope to move the State towards the goal that 100 percent of equipment will be zero-emission by 2035 where technologically feasible:

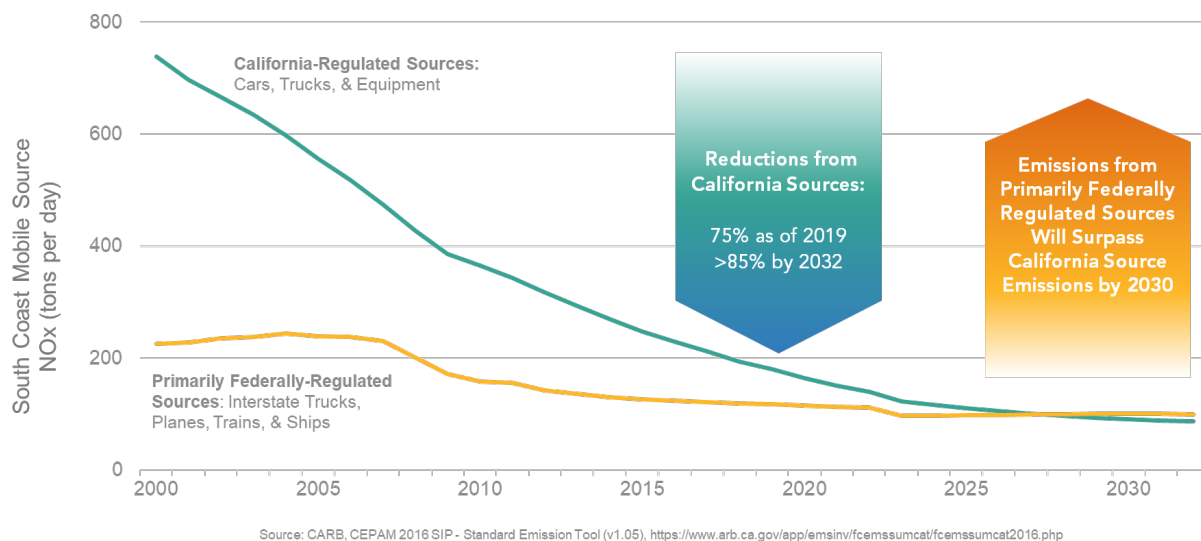
- Manufacturer requirements to foster clean technology production and sales;
- In-use requirements to accelerate penetration of newer technology;
- Incentive programs to promote and accelerate the use of advanced clean technologies;
- Outreach and education to increase consumer awareness and acceptance of advanced vehicle and equipment technologies; and

- Infrastructure planning and development to support the transition to cleaner technologies.

Tenets of the 2020 Mobile Source Strategy

As outlined above, a key focus of the 2020 Strategy is advancing the use of zero-emission technologies wherever feasible. Regulatory mechanisms will continue to be the core of CARB’s programs and provide the vast majority of emissions reductions identified in the 2020 Strategy. Even so, in the near-term, incentive programs to promote and accelerate the use of these and other clean technologies will be essential to meeting our pre-2030 air quality goals and setting us on the trajectory for the future goals. In addition to funding, it is critical that we structure programs so that clean transportation is accessible to all Californians, particularly those in low-income and disadvantaged communities who experience a disproportionate share of pollution impacts.

Further, for California to meet air quality standards, it is imperative that the federal government act decisively to reduce emissions from primarily federally-regulated sources of air pollution, including interstate trucks, ships, locomotives, aircraft, and certain categories of off-road equipment. Absent federal action, by 2030, NOx emissions from federally-regulated sources will exceed emissions from California-regulated mobile sources in the South Coast, California’s most challenging ozone nonattainment area.



Since the release of the 2016 Strategy, CARB and our local partners in California have taken concrete actions to not only petition federal agencies for action, but also to directly reduce emissions using programmatic mechanisms within our respective authorities. Unfortunately, action by the U.S. Environmental Protection Agency (U.S. EPA) to limit emissions from these sources have not yet materialized making it more challenging to meet federal air quality standards and reduce air pollution that harms public health in California and across the U.S.

The 2020 Strategy is a call to action, not only for California, but for the federal government as well.

Public Process for the 2020 Mobile Source Strategy

Staff has engaged in a robust public process throughout development of the 2020 Strategy, including release of the [Workshop Discussion Draft 2020 Mobile Source Strategy](#) on September 30, 2020, and the [Draft 2020 Mobile Source Strategy](#) on November 24, 2020. As part of the public comment processes on the drafts, staff received numerous comments that emphasized the importance of near-term mobile source emissions reductions, and further requested that CARB expand upon the discussions of programmatic concepts that could reduce emissions in the next five years. Staff understands the critical importance of reducing emissions in the near-term for attainment of federal standards and to improve air quality in the most impacted communities and, as such, has identified in this Revised Draft the programs and new concepts that can achieve emissions reductions in the near-term.

In addition, an informational update on the Draft 2020 Strategy was presented to the Board in December 2020. At that time, the Board directed staff to continue to develop the 2020 Strategy for the primary purpose of building on efforts to reduce emissions to meet near-term SIP targets and provide benefits in disadvantaged communities. In addition, the Board directed staff to accelerate the adoption and implementation of the heavy duty inspection and maintenance program, targeting benefits in low-income and disadvantaged communities where possible; and to add to the discussion on efforts to reduce vehicle miles travelled (VMT), while considering how we can better partner with locals and other agencies to tackle housing and land use, and to support transit and biking options.

Updates Since the November 2020 Draft Release

In response to public feedback and Board direction received at the December hearing, a number of updates have been included in this Revised Draft. Chapter 4 of this document discusses in detail the newly-identified and ongoing efforts to achieve reductions in the next five to ten years. This includes measures from the 2016 Strategy and associated [2016 State Strategy for the State Implementation Plan](#), for which implementation is ongoing – many of the measures committed to in those plans will achieve substantial near-term reductions. CARB staff have continued to work to identify and develop additional near-term actions to reduce emissions, and find ways to accelerate emissions and target benefits of regulatory programs already in development in priority communities.

In Chapter 2, we further explore the actions that CARB has taken and current efforts to ensure a focus on environmental justice and equity in CARB's programs into the future. CARB has long worked to reduce negative effects from air pollution in the State's most highly-impacted populations, through programs to control emissions from freight transport and other significant sources affecting low-income and disadvantaged communities. In recent

years, CARB and the State have been further enabled through [Assembly Bill \(AB\) 617](#)³ programs, [Senate Bill 350](#)⁴ (SB 350) equity efforts, and Low Carbon Transportation to renew our focus on and engagement with these communities, but disadvantaged communities continue to experience the highest levels of air pollution impacts in California. CARB and the State of California are committed to prioritizing the needs of historically under-served communities in our work – as such, environmental justice will be a core consideration within all CARB actions and programs moving forward.

Concepts included in the 2020 Strategy that will reduce emissions in low-income and disadvantaged communities are shown below and described in further detail in Chapter 2 and Chapter 6.

- Cars and Trucks
 - Cars: Zero-emission and cleaner combustion requirements
 - Trucks and Buses: Zero-emission requirements and regulations to ensure in-use combustion equipment remains clean
 - Vehicle Miles Travelled: Increased access to alternative mobility options such as walking, bicycling, transit, and equitably address land use issues through accelerated infill housing development and other means
- Near-Port Emissions Sources
 - Drayage Trucks: Full transition to zero-emission by 2035
 - Ocean-going Vessels: Cleaner marine engine standards and cleanest vessel visits requirements
 - Commercial Harbor Craft: Clean combustion, renewable fuel and zero-emission requirements
 - Cargo Handling Equipment: Full transition to zero-emission equipment starting in 2026 at ports and railyards
- Commercial/Industrial and Warehouse Emissions Sources
 - Small Off-Road Engines, Forklifts, and Transport Refrigeration Units: Full transition to-zero emission equipment starting in 2024
 - Locomotives: Accelerated turnover to cleanest combustion
 - Construction, Industrial and Mining: Replace dirtiest vehicles with cleanest available technology
- Other Emissions Sources
 - Recreational Boats: Cleanest combustion and zero-emission requirements
 - Aircraft: Cleaner engines, efficiency improvements and zero-emission operation

CARB and the State of California are committed to dismantling embedded systems of disenfranchisement and discrimination, and to prioritizing the needs of historically

³ C. Garcia, Chapter 136, Statutes of 2017

⁴ De León, Chapter 547, Statutes of 2015

under-served communities in our work. In order to comprehensively address equity in California's transportation system, we must do more than reduce emissions by transforming the fleet to cleaner and zero-emission vehicles – we must also tackle land use and find ways to provide increased mobility options to the communities who need them. Historic decision-making favoring single-occupancy vehicle travel shaped many communities. Where and how communities plan and build housing imposes and often reinforces long-standing racial and economic injustices that leave residents with little choice but to spend significant time and money commuting long distances in search of an affordable place to live. This places a disproportionate burden on low-income Californians, who end up paying the highest proportion of their wages for housing and transportation. In the *Beyond ZEVs* section of Chapter 6, we identify strategies CARB can undertake to address these issues, which would simultaneously reduce VMT, achieve additional emissions reductions and support implementation of regional planning efforts.

Moving forward, the concepts contained in the 2020 Strategy will be translated into federally-enforceable measures and commitments that will be included in the next [State Implementation Plan](#) strategy being developed for the 70 parts per billion (ppb) 8-hour ozone standard. Further, the 2020 Strategy will be inform mobile source elements of the 2022 Scoping Plan Update, and be incorporated into community emission reduction plans and other CARB planning documents to be released in the coming years. As such, in addition to a final Board hearing on the 2020 Strategy this summer, the concepts included here will see many opportunities for public input as they are incorporated into additional planning documents, and further developed into regulations and other programs through formal rulemaking processes.