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OVERSIGHT HEARING OF THE SENATE ENVIRONMENTAL QUALITY COMMITTEE

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Wednesday, January 18, 2017
9:30 a.m.
California State Capitol, Room 3191

California Air Resources Board: An Overview of Air Pollution

BACKGROUND INFORMATION

Introduction

Los Angeles has the dubious honor of being the first place in California to experience severe air pollution. As early as 1905, Los Angeles was adopting measures to try to control smoke emissions after a severely smoggy day in 1903 caused the city to experience something many described as a solar eclipse.

In the summer of 1943, Los Angeles saw a day of air pollution like the world had never seen before. Smoke and fumes in downtown Los Angeles caused people to experience stinging in their eyes and a sensation that their throats were being scraped with every breath. Although initially blamed on a chemical manufacturing plant,

evidence proved the incident was caused by emissions from backyard trash incinerators, refineries, vehicles, and diesel buses.

As a result, the Los Angeles County Board of Supervisors appointed a Smoke and Fumes Commission to study the County's air problems. In 1947, after a bill flew through the Legislature and was signed by Governor Earl Warren giving counties the authority to regulate air pollution, the Los Angeles County Board of Supervisors then established the Los Angeles County Air Pollution Control District, the first air pollution control program in the United States.

Across the Atlantic ocean, in 1952 the Great Smog of London was a five-day, severe air pollution event made possible by a combination of unfortunate weather patterns and dirty sources of energy such as coal-burning power plants, diesel engines, and households burning coal for heat. It is estimated that between 4000-12,000 people died from breathing in London fog that had been permeated with toxic particles of smoke, hydrochloric acid, fluorinated compounds, and sulfur dioxide. As many as 100,000 more people suffered health consequences from the Great Smog of London—mainly respiratory illnesses—and visibility on the roads was decreased to the point where driving was sometimes impossible.

As a group, the chemicals that caused the problems in Los Angeles and the Great Smog of London are the same types of pollutants we still deal with today in California. They are poisonous, toxic, carcinogenic, and cause a variety of negative health conditions. Smoke particles and other volatile organic compounds lead to cardiovascular and respiratory illness, and premature death.

Some halogenated compounds are known endocrine disrupters and neurotoxins, which can cause cancerous tumors, birth defects, developmental disorders, central nervous system damage, intellectual disability, persistent memory impairments, epilepsy, and dementia.

Poor air quality causes the lungs to constrict, resulting in wheezing, shortness of breath and chest tightness, especially during exercise or physical activity.

Children, the elderly, and people with asthma, cardiovascular disease or chronic lung disease are most susceptible to these symptoms. Long-term exposure to sulfur dioxide causes an increased risk of lung disease and increases the risk of death.

While dramatic, the Great Smog of London and early Los Angeles experiences highlight how important it is to ensure that we have strong measures in place to control air pollution. Air pollution can have dire impacts on the health and safety of both people and the environment.

Over the last 65 years, California has instituted programs and measures to protect California air and reduce air pollution. Today California's air quality has improved, but criteria air pollutants (see below) from vehicles and refineries continue to present very real risks to human health and the environment.

Air Quality Laws and Regulations

The federal Clean Air Act and its implementing regulations are intended to protect public health and environmental quality by limiting and reducing pollution from various sources. Under the Clean Air Act, US EPA establishes National Ambient Air Quality Standards (NAAQS) that apply to outdoor air throughout the country.

These federal standards exist for six "criteria pollutants" due to their negative impact on public health above specified concentrations. These are ground-level ozone, Particulate Matter (PM), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide, and lead. The US EPA reviews each NAAQS at five-year intervals to ensure that the standards are based on the most recent scientific information.

Regions that do not meet the national standards for any one of the standards are designated "nonattainment areas." The Clean Air Act sets deadlines for attainment based on the severity of nonattainment and requires states to develop comprehensive plans, known as the state implementation plan (SIP), to attain and maintain air-quality standards for each area designated nonattainment for an NAAQS.

State and federal law require nonattainment regions of California to meet existing clean air standards by 2015 for annual PM 2.5 (particulate matter 2.5 microns or less

in diameter), and by 2023 for the 8-hour average ozone standard. The South Coast and San Joaquin air basins recently missed the 2015 attainment deadline for the last PM 2.5 standard. Additionally, tougher federal air quality standards for both particulates and ozone issued in 2006 and 2008 will require reductions in those regions well above and beyond those already planned.

As vehicles are one of the primary sources of air pollution nationally, the Clean Air Act authorizes US EPA to establish and regulate emissions standards for mobile sources. These regulations include vehicle emission limits for hydrocarbons, carbon monoxide, NOx, and particulate matter.

State law assigns the ARB with primary responsibility for control of mobile-source air pollution, including adoption of rules for reducing vehicle emissions and the specification of vehicular fuel composition. Stationary sources of air pollution, such as factories and refineries, are under the jurisdiction of local air districts (e.g., South Coast Air Quality Management District, San Joaquin Valley Air Pollution Control District). ARB and the local air districts share jurisdiction over emissions of toxics from stationary sources.

California, due to its preexisting vehicle-emission standards and severe motor vehicle air pollution problems, is authorized under the Clean Air Act to implement separate mobile emission standards from the federal government. Other states may choose to follow either the national standard or the stricter California standards.

Pursuant to its authority to control mobile-source air pollution, ARB has a host of programs and has adopted many regulations designed to reduce emissions from mobile sources to help meet state and federal air-quality standards.

Highlight of ARB Air Pollution Programs, Regulations, and Agreements

Alternative Diesel Fuel (ADF) Regulations. This suite of regulations maintains current air quality and toxic air pollution protections as new and emerging nonhydrocarbon-based diesel fuel substitutes are introduced into California under the Low Carbon Fuels Standard.

ARB/Railroad Agreements: 1998 and 2005. The 1998 Locomotive Fleet Average Agreement was designed to reduce Union Pacific (UP) and Burlington Northern Santa Fe (BNSF) locomotive NOx emissions in the South Coast air basin by 67% between 2000 and 2010. The 1998 Agreement also provides up to a 50% reduction in UP and BNSF locomotive particulate matter emissions in the South Coast air basin. The 2005 Agreement provides up to a 20% reduction in locomotive particulate matter emissions in and around rail yards statewide.

California Reformulated Gasoline (RFG) Program and Diesel Fuel Standards. These standards required refineries to reformulate gasoline to eliminate lead from gasoline and reduce quantities of other toxic and smog-forming compounds and are commonly known as the "summer" and "winter" blends of gasoline. Although these blends generally make gasoline prices higher, they have resulted in a significant reduction of sulfur compound emissions, NOx emissions, ozone-forming emissions, diesel PM, carbon monoxide, and other toxic compounds.

Carl Moyer Program. The Carl Moyer Program provides grants through the state's 35 local air quality management and air pollution control districts (local air districts) for deployment of engines, equipment, and emission-reduction technologies that are cleaner than required by current laws or regulations. According to ARB, the Carl Moyer Program provides about $60 million for projects each year statewide. The program pays up to 85% of the cost to repower engines and up to 100% to purchase an ARB-verified retrofit device. Maximum grant amounts vary for purchase of new vehicles and equipment.

Clean Vehicle Rebate Project (CVRP). The CVRP is funded by ARB and administered by the Center for Sustainable Energy, in order to promote the production and use of zero-emission vehicles, including electric, plug-in hybrid electric and fuel cell vehicles. CVRP enables the purchaser or lessee of an eligible vehicle to receive a rebate. A consumer can apply for a rebate within 18 months of purchasing or leasing an eligible vehicle. The consumer must retain ownership of the vehicle in California for at least 30 consecutive months after the purchase or lease date or reimburse ARB for part of or the entire rebate amount. Rebates are distributed on a first-come, first-served basis and issued within 90 days of application approval.

CVRP provides a rebate of up to $5,000 for purchasing or leasing a new zero-emission vehicle or plug-in hybrid electric vehicle. Specifically, a consumer may obtain a $5,000 rebate for a hydrogen fuel-cell vehicle; a $2,500 rebate for a zero-emission, battery electric vehicle; a $1,500 voucher for a plug-in hybrid electric vehicle; or, a $900 rebate for a neighborhood electric vehicle or a zero-emission motorcycle. There is no cap on the number of rebates that may be issued, but rebates are subject to funding availability and the program has more than once been forced to stop issuing rebates and create a waiting list due to funds running out.

Enhanced Fleet Modernization Program (EFMP). The EFMP enables a vehicle owner to retire a high-polluting passenger vehicle or light- or medium-duty truck. A vehicle need not have failed a smog test to qualify for EFMP, but it must meet ARB's definition of high polluting. Under the statewide component of EFMP, ARB administers a program, in consultation with the California Bureau of Automotive Repair, to scrap high-polluting vehicles. Under this program, EFMP offers a $1,500 voucher to low-income vehicle owners (household income at or below 225% of federal poverty level), or a $1,000 voucher to all other vehicle owners, to retire a high-polluting vehicle. EFMP does not place technology restrictions on the kind of vehicle that a consumer may purchase, only that the vehicle meets certain emission standards.

EFMP Plus-Up. EFMP also has a vehicle replacement component, known as EFMP Plus-Up. Under EFMP Plus-Up, a low-income owner living in one of these districts can get a $2,500 "replacement" voucher in addition to the $1,500 base EFMP "retirement" voucher. The owner may use the funds to either purchase a car that is less than eight years old or to obtain a public transit voucher. If a low-income owner lives in a disadvantaged community in one of these air districts, and wants to purchase a hybrid, plug-in hybrid, or battery electric vehicle, he or she can "stack" additional incentives on top of these two vouchers. Depending on the owner's income and the type of replacement vehicle, the owner can receive up to $12,000 toward the purchase of a new car. The ARB is currently working with local air districts to expand EFMP Plus-Up to disadvantaged communities in Sacramento, San Diego, and the bay area.

Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP). HVIP is administered by ARB and its contractor, CALSTART. HVIP provides vouchers to California fleet owners to help purchase hybrid and zero-emission trucks and buses.

Low Emission Vehicles I/II/III (LEV I/II/III). Adopted in 1990, the LEV I standards applied to criteria pollutant emissions for vehicles from 1994 through 2003. Amendments adopted in 1998, termed LEV II, tightened the fleet average emission standards for 2004-2010, and required significantly lower NOx emissions from specific vehicle categories. In 2012, ARB adopted the LEV III amendments, which include more stringent emission standards for both criteria pollutants, including NOx, and greenhouse gases for new passenger vehicles.

NOx and Low NOx Engine Standards. The ARB currently has standards in place that have substantially reduced NOx emissions. The Low NOx standards are 50-90% lower than the current NOx standard, but it is currently voluntary so the ARB provides incentive funding to promote the purchase of trucks with engines certified to meet the Low NOx standard. The ARB is working with the federal EPA to make the Low NOx standard mandatory, which could happen as early as this year.

Ocean-Going Vessels at Berth Regulation. This regulation requires fleets of container, refrigerated cargo, and cruise ships to plug into shore-based electrical power rather than running their auxiliary diesel engines when at-berth at California ports, or use an alternative control technology to reduce emissions of diesel PM, NOx, and GHGs. This has reduced diesel and NOx emissions by 50% at-berth and eliminates GHG emissions from the ship while connected to shore power. At full implementation in 2020, regulated fleets will reduce their total auxiliary engine emissions by 80%.

Phase 1/2 Medium- and Heavy-Duty Engine and Vehicle GHG Emission Regulation. Phase 1 of this regulation aimed to substantially reduce NOx emissions from heavy-duty vehicles and reduces GHG emissions from medium- and heavy duty engines and larger trucks, buses, and vans. The regulation established compliance requirements for diesel and gasoline engines, and trucks from Class 2b through Class 8. The regulation segregates truck compliance into three groupings: pickups

and vans; vocational vehicles; and combination tractors. Phase 2 of this regulation will be presented by staff to the ARB sometime in 2017 and aims to further reduce GHG emissions from medium- and heavy-duty vehicles. It will be applicable starting with the 2018 model year for trailers and with the 2021 model year for engines and vehicles, will expand the scope and stringency of the federal GHG standards, and will include first-time requirements for certain trailer types.

Public Fleet Pilot Project. The Public Fleet Pilot Project, administered by the Center for Sustainable Energy for ARB, offers up to $15,000 in rebates for the purchase of new, eligible zero-emission and plug-in hybrid light-duty vehicles. The project replaces standard CVRP rebates with increased incentives for public agencies operating in the state's disadvantaged communities.

Truck and Bus Regulation. The Truck and Bus Regulation aims to reduce air toxics (diesel PM) and other criteria pollutants by ensuring that nearly every heavy-duty vehicle operated in California meets 2010 heavy-duty engine emission standards by 2023. PM filter requirements for heavier trucks and buses phased in beginning January 2012 and engine replacement requirements for heavier and lighter trucks began phase-in January 2015.

Truck Loan Assistance Program. Creates financing opportunities for small-business truck owners affected by the Truck and Bus Regulation to upgrade with new trucks or retrofit with diesel exhaust control devices. As of December 31, 2015, about $71 million in program funding has been expended to provide about $575 million in financing for the purchase of nearly 9,500 cleaner trucks, exhaust retrofits, and trailers.

Zero-Emission Truck and Bus Pilot Projects. SB 1204 (Lara, Chapter 524, Statutes of 2014) requires ARB to develop a new program, the California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program. This program, known as Zero-Emission Truck and Bus Pilot Projects, will fund development, demonstration, pre-commercial pilot, and early commercial deployment of zero- and near-zero-emission truck, bus, and off-road vehicle technologies, with prioritization of projects located in disadvantaged communities.

Zero Emission Vehicle (ZEV) Regulation. The Zero Emission Vehicle (ZEV) Regulation requires large volume and intermediate volume vehicle manufacturers that sell cars in California to produce ZEVs (such as battery electric and fuel cell vehicles), clean plug-in hybrids, clean hybrids and clean gasoline vehicles with near-zero tail pipe emissions. In general, the ZEV regulation requires that 15% of new car sales be ZEVs by 2025. This target is intended to achieve 1.5 million ZEVs on the road by 2025 as directed under Governor Brown's Executive Order B-16-2012.

Concluding Remarks and Questions

When left unchecked air pollution can have dire consequences on the health and safety of both people and the environment.

Depending on exposure, air pollution alone can cause an increased risk of cardiovascular and respiratory illness, lung disease, cancerous tumors, birth defects, developmental disorders, central nervous system damage, intellectual disability, persistent memory impairments, epilepsy, dementia, and premature death.

In light of the fact that the South Coast and San Joaquin air basins are not likely to reach attainment status by the extended 2024 deadline, a number of questions arise.

- Given the wide array of programs at the ARB that address air pollution, are there some that are less effective than others?
- A recent report by South Coast Air Quality Management District scientists found that Volatile Organic Compounds (VOCs) are being significantly underestimated in their air basin and that oil and gas production is a very significant VOC emission source. Given that, is there anything the ARB can do to address this recently discovered problem?
- Are there any sources of air pollution that are not under the ARB's jurisdiction that the ARB could alleviate through means other than direct regulation?
- What are the actions or measures ARB has identified that local air districts could take, but are not, that could help reach attainment?

Finally, California has faced federal administrations in the past that have not supported the stricter standards we have set that are necessary to meet our obligations under the federal and state Clean Air Acts. What measures can California take to strengthen the state's air quality programs to better protect air quality in California?

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