

AB 32 Implementation: Light Duty Vehicles and Their Fuels

An Informational Hearing of the Senate Transportation and Housing Committee

**March 19, 2013 – 1:30 PM
State Capitol, Room 112**

BACKGROUND PAPER

Purpose

This informational hearing of the Transportation and Housing Committee will examine how the California Air Resources Board's implementation of AB 32 will transform the cars Californians drive and the fuels those cars use.

Background – AB 32

State law assigns the California Air Resources Board (ARB) with primary responsibility for implementing California's air quality and greenhouse gas (GHG) emission policies. State law gives ARB authority to control mobile source air pollution, including the adoption of rules for the reduction of harmful vehicle emissions and the specification of vehicular fuel composition.

In 2006, the Legislature passed and the Governor signed AB 32 (Núñez and Pavley), Chapter 488, to establish a statewide GHG emissions limit such that by 2020 California shall reduce its GHG emissions to the level they were in 1990. Carbon dioxide is but one greenhouse gas; others include methane, nitrous oxide, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

AB 32 requires the ARB, among other things, to:

- Inventory GHG emissions in California. (ARB's measurement shows that transportation accounts for 38 percent of GHG emissions in the state.)
- Implement regulations and impose fees that achieve the maximum feasible and cost-effective reduction in GHG emissions.
- Identify and adopt regulations for discrete early actions to reduce GHG emissions.

In analyzing GHG emissions by economic sector, ARB found that no one sector had a sufficiently large share of GHG emissions to become the primary focus for emissions reductions. ARB recognized the need for significant reductions in the transportation, electricity, commercial and residential, and industrial sectors, as well as contributing reductions from other sectors of the economy. Consequently, ARB has initiated multi-faceted GHG emissions strategies since the 2006 enactment of AB 32. Those strategies combine market-based regulatory approaches, other regulations, voluntary measures, fees, policies, incentives, and programs, including nine discrete early actions.

In January 2007, Governor Schwarzenegger issued Executive Order S-01-07 in which he ordered the establishment of a statewide goal of reducing the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and ordered ARB to establish a low-carbon fuel standard (LCFS) for the state. ARB adopted the LCFS regulation in April 2009, and it took full effect a year later.

In May 2009, ARB adopted its AB 32 Scoping Plan to map out how to achieve the reduction in GHG emissions by 2020, as required by AB 32. ARB established that reduction to be 174 MMTCO₂E (million metric tons of carbon dioxide equivalent, a measure of greenhouse gas emissions). ARB has since revised this number down to 80 MMTCO₂E due to changes in energy consumption. This 80 MMTCO₂E reduction represents a 16 percent reduction compared to business as usual.

ARB proposes to achieve approximately 78 percent of the reductions through identified regulatory measures and the balance of reductions necessary to meet the 2020 limit (approximately 18 MMTCO₂E) through a cap-and-trade program, which beginning in 2015 will include transportation fuels. The scoping plan also attributes a reduction of 15 MMTCO₂E to the LCFS strategy and 4 MMTCO₂E to adoption of the Advanced Clean Car standards.

These three regulatory efforts – fuels under the cap, the LCFS, and the Advanced Clean Car standards – are those that will likely have the most significant impact on the cars Californians drive and the fuels those cars use. Each is described in more detail below and each will play a role in initiating for light duty vehicles what ARB refers to as the transformations required to achieve the long range target reflected in California Executive Order S-3-05 (an 80 percent reduction of GHG emissions from 1990 levels by 2050).

Cap-and-Trade

In a cap-and-trade program, a limit, or cap, is put on the amount of pollutants (GHGs) that can be emitted. Each allowance equals one MMTCO₂E. The total number of allowances created is equal to the cap set for cumulative emissions from all the covered sectors. These allowances may be auctioned and/or freely given to companies or other groups. In addition to allowances, emissions reductions from sources that are outside the cap coverage, called offsets, could be authorized. This would allow emissions in the capped sectors to exceed the allowances issued. After initial distribution of allowances, compliance instruments (*i.e.*, allowances and offsets) may be traded among entities. At the end of each compliance period, covered entities are required to turn in, or surrender, enough compliance instruments to match their emissions during this time period.

ARB adopted its cap-and-trade program under AB 32, which beginning January 1, 2013, imposes a firm declining cap on emitters responsible for 85 percent of California's GHG emissions, including initially those from electricity and large industrial sources, and then later those from transportation fuels and residential and commercial use of natural gas and propane. It is expected that by 2020 the cap-and-trade regulation will reduce GHG emissions by about 18 MMTCO₂E.

In the first compliance period of 2103-14, only electric utilities and industrial facilities are under ARB's cap. In 2015, distributors of transportation, natural gas, and other fuels also come under the cap. Once under the cap, an entity covered by the regulation must periodically submit to ARB allowances sufficient to match its GHG emissions during the period.

ARB is allocating most allowances for free in order to provide transition assistance and to minimize leakage. (Leakage refers to a reduction in GHG emission within California that is offset by an increase outside the state.) ARB is, however, auctioning off about ten percent of allowances. The first auction of allowances took place in November of last year, and ARB is now holding auctions on a quarterly basis.

When transportation fuels come under the cap in 2015, suppliers of fuels will be required to turn in allowances sufficient to match their GHG emissions. Due to the newness of this regulation and its on-going evolution, it is unclear how the cap on transportation fuels will affect the content and prices of gasoline and similar products.

The Low-Carbon Fuel Standard

ARB staff designed the LCFS to reduce GHG emissions by reducing the carbon intensity (CI) of transportation fuels used in California by an average of 10 percent by the year 2020.

CI is a measure of the direct and indirect GHG emissions associated with each of the steps in the full fuel-cycle of a transportation fuel (also referred to as the "well-to-wheels" for fossil fuels, or "seed or field-to-wheels" for biofuels). The overall GHG contribution from each particular step in the production and delivery process is a function of the energy that step requires. Thus, if a

fuel that requires little energy to produce and produces results in low carbon emissions when consumed has to be trucked a long way to market, it can still have a high fuel-cycle CI because of the high energy requirements of getting it to market.

The LCFS achieves a 10 percent reduction in average CI by establishing an initial intensity level for specified providers of transportation fuels (“regulated parties”) and incrementally lowering the allowable CI in each subsequent year. For example, modest targeted reductions of 0.5 and 1.0 percent are required for 2012 and 2013, respectively. The reductions become more substantial with each year, such that by 2020, the 10 percent average reduction is achieved. This reduction makes room for low-CI alternative fuels to enter the market.

A regulated party’s overall CI for its transportation fuels needs to meet each year’s specified CI level target. If the reduction in intensity exceeds the target, the provider earns a credit, which can be sold or carried forward. The LCFS allows fuels like electricity, hydrogen, and natural gas – which already meet the CI standards through 2020 – to generate LCFS credits that may be sold.

Regulated fuel providers, therefore, can meet their annual CI levels through several compliance strategies:

- Making low-GHG fuels, such as biofuels made from waste products;
- Carrying forward credits from previous years from their own production process;
- Buying credits from other fuel producers; or
- Reducing the amount of fuel they sell.

A fuel provider would meet the CI requirements of the LCFS if the amount of credits at the end of the year is equal to, or greater than, the deficits. A provider determines its credits and deficits based on the amount of fuel sold, the CI of the fuel, and the efficiency by which a vehicle converts the fuel into useable energy. Fuel providers may retain and trade credits so that they can meet their assigned obligations.

Under the LCFS, a regulated party’s compliance with the annual CI requirements is based on end-of-year credit/deficit balancing.

Advanced Clean Cars

In 2002, the Legislature passed and the Governor signed AB 1493 (Pavley), Chapter 200, which required that the ARB to develop and adopt, by January 1, 2005, regulations to achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from light duty vehicles applicable no sooner than the 2009 model year. ARB did develop these regulations but automaker lawsuits threatened their implementation, and the US EPA initially denied California’s request for a waiver needed under federal law to implement them. The parties involved reached an agreement in May 2009 that resolved the issues. Based on this agreement, ARB implemented its regulations to reduce GHG emissions in new passenger vehicles from 2009 through 2016, such that GHG emissions from cars will be about 30 percent lower in 2016

than in 2009. These regulations are commonly referred to as the “Pavley” regulations or “Pavley I.”

In January 2012, ARB built on the Pavley I standards with its Advanced Clean Car program. This program is a suite of regulations that combines the control of smog-causing pollutants and greenhouse gas emissions into a single coordinated package of requirements applicable to vehicles for model years 2017 through 2025. In October 2012, the federal government adopted similar GHG emissions (and mileage) standards for vehicles, so it is possible for automakers to demonstrate compliance with California’s regulations based on compliance with federal standards. The Advanced Clean Cars program includes three regulatory mechanisms:

- The LEV III regulations include new GHG emission standards for cars and light trucks plus regulations to reduce smog-forming emissions from vehicles. This new standard drops GHG emissions by 34 percent from the 2016 standard during the 2017-25 model years.
- The ZEV regulation requires that by 2025 about 15 percent of new car sales will be zero emission. This will ensure that there will be 1.5 million ZEVS on the road by 2025 as directed under Governor Brown’s Executive Order B-16-2012. This ZEV regulation requires automakers to produce and sell ZEVs in order to achieve this mandate. Automakers may also produce and sell vehicles that are partially zero emission or help transition to ZEVs in order to meet the mandate.
- The Clean Fuels Outlet regulation would require major refiners and importers of gasoline to provide hydrogen fueling stations when the number of vehicles using hydrogen fuel reaches 10,000 within an air basin or 20,000 statewide with specified adjustments. In December 2012, ARB withdrew the Clean Fuels Outlet rulemaking package from the Office of Administrative Law in order to pursue legislation that would dedicate public funds to building a hydrogen fueling network sufficient to provide convenient fueling for vehicle owners, which would effectively achieve the goal of the Clean Fuels Outlet regulation. ARB is in the process of reintroducing the Clean Fuels Outlet rulemaking package as a contingency measure in case the legislation fails.

Issues for Discussion

The committee may wish to consider the following during the hearing:

Achieving AB 32 Goals. In recognition of the threat to our environment, human health, and human society posed by global warming, California enacted AB 32 to reduce GHG emissions significantly by 2020. ARB indicates that reducing GHG emissions to 1990 levels by 2020 and by 80 percent of 1990 levels by 2050 means completely altering the types of cars Californians drive and the fuels we use.

Transforming the vehicle fleet. ARB’s regulations are aimed at both achieving the AB 32 GHG emission target for 2020 but also at beginning a transformation of the vehicle fleet to achieve the 2050 GHG goal established in Executive Order. One scenario that ARB often presents is that in

order to meet the 2050 goal, the light duty vehicle fleet in place in 2050 would be about 60 percent hydrogen fuel cell vehicles, 25 percent battery electric vehicles, 10 percent plug-in and conventional hybrid, and just 5 percent gasoline-powered internal combustion engine vehicles. Given that out of the 27 million cars and pickup trucks on the road in California today only about 140,000 are alternatively fueled and 570,000 are hybrids, this would be a tremendous transformation over the next 35 years and would require unprecedented change in auto consumer demand.

Fueling infrastructure. One significant barrier to transforming the light duty vehicle fleet in the way that ARB envisions is the current lack of fueling facilities for alternatively fueled vehicles. While electric infrastructure is all around and thousands of vehicle charging points are installed each year, ARB plans that most cars on the road in 2050 would be hydrogen fueled. According to the California Fuel Cell Partnership, California is currently home to seven hydrogen fueling stations that are open to the public. In order to have a well-functioning, price-competitive market for hydrogen fuel, it will take thousands of hydrogen stations to provide fuel as California rapidly transitions.

Use of tax revenues. ARB and other state agencies rely heavily on public subsidies to provide incentives to consumers, vehicle manufacturers, fuel providers, and others to produce and use alternatively fueled cars and their fuels. These revenues come from a number of sources including fees on vehicles, corporate income taxes, and legal settlements. In the future, they could include cap-and-trade auction revenues as well as additional tax revenues. Ultimately in order for this transition to succeed, consumers, producers, and sellers of vehicles and fuels must be weaned off these government subsidies. As the state creates incentive programs, it should also lay out how and when those programs will conclude so that public resources are used wisely and so that the market functions independent of public subsidy.

Consumer behavior. Market stability depends, in part, on government signals that allow for the development and transition of technologies. Additionally, consumer demand influences market stability, and government signals can encourage consumers to choose cleaner technologies. While ARB's regulations impact commercial enterprises directly, it is unclear how they would or could impact consumer preferences and behavior. Policymakers may want to consider what efforts could further influence consumer demand to achieve the state's GHG emission goals.

Witnesses

This hearing will include ARB testimony on its regulatory policies and then three panels of witnesses reacting to the ARB's regulations. Background for witnesses is provided below:

California Air Resources Board

Alberto Ayala, Ph.D., is a Deputy Executive Officer of ARB, a post he has held since the end of 2012. In this position he is responsible for ambient monitoring and laboratories as well as mobile source control and operations programs. He joined CARB's research staff in 2000 and has since held various management assignments in programs such as Carl Moyer Incentives,

AB 32 early actions, and car, truck, and bus emissions research. Most recently he served as Chief of the Monitoring and Laboratory Division.

Richard Corey is a Deputy Executive Officer of ARB and in this position is responsible for a broad range of programs including those concerning fuels, climate, incentives, and air toxics. Some of the key programs that his team is responsible for implementing include the low carbon fuel standard and the cap-and-trade regulation. Prior to his appointment as a Deputy Executive Officer, he served as Chief of the Stationary Source Division. Mr. Corey has over 20 years of experience in a management capacity with ARB.

Panel 1: An Independent Critique

Blake Simmons, Ph.D., is a Senior Manager and the Biofuels Program Lead at Sandia National Laboratories in Livermore, California, and is also the Vice-President of the Deconstruction Division at the Joint BioEnergy Institute, one of three Bioenergy Research Centers created by the US Department of Energy to advance the development of renewable drop-in biofuels derived from non-food feedstocks. He is a chemical engineer by training and his areas of expertise as a scientist and as a technical manager include biofuels, nanoporous materials, nanotechnology, nanoelectronics, fuel cells, and hydrogen storage.

Tiffany Roberts serves in the Legislative Analyst's Office (LAO) as the Senior Fiscal and Policy Analyst for Air Quality, Energy, and Climate Change. The LAO is the California Legislature's nonpartisan fiscal and policy advisor.

Panel 2: Providers' Perspectives

Curt Augustine is the Director of Policy and Governmental Affairs for the Alliance of Automobile Manufacturers. The Alliance is an association of 12 vehicle manufacturers including BMW Group, Chrysler Group LLC, Ford Motor Company, General Motors Company, Jaguar Land Rover, Mazda, Mercedes-Benz USA, Mitsubishi Motors, Porsche, Toyota, Volkswagen Group of America, and Volvo Cars North America.

Catherine Dunwoody is the Executive Director of the California Fuel Cell Partnership (CaFCP). The CaFCP is a government industry collaboration that includes auto manufacturers, energy providers, government agencies, and fuel cell technology companies that work together to promote the commercialization of hydrogen fuel cell vehicles.

Bob Epstein, Ph.D., is a founder of Environmental Entrepreneurs, a broad-based group of business leaders that provides an independent, nonpartisan resource for understanding the business perspective on environmental issues. Mr. Epstein is an entrepreneur and an engineer who has co-founded five companies: Sybase, New Resource Bank, GetActive Software, Colorado Microdisplay, and Britton-Lee. He currently splits his professional time between his roles as co-founder of Environmental Entrepreneurs, Director of New Resource Bank, Advisory Board for the Goldman School of Public Policy, and Chairman of the Natural Resources Defense Council Action Fund.

Catherine Reheis-Boyd is the President of the Western States Petroleum Association (WSPA). WSPA is a trade association for companies that account for the bulk of petroleum exploration, production, refining, transportation, and marketing in the six western states of Arizona, California, Hawaii, Nevada, Oregon, and Washington. Membership includes 27 companies, such as BP, Chevron, ConocoPhillips, ExxonMobile, Shell, and Valero.

Eileen Tutt is the Executive Director of the California Electric Transportation Coalition (CaETC), which is an association working to promote electric transportation as a means to achieve California's clean air and GHG emission reduction goals. Members of CaETC include Southern California Edison, San Diego Gas & Electric, Pacific Gas & Electric, the Sacramento Municipal Utility District, the Los Angeles Department of Water and Power, General Motors, Mercedes Benz, and Nissan. Prior to her work with CaETC, Ms. Tutt worked for the California Environmental Protection Agency and the ARB.

Panel 3: Environmental Perspectives

Adrienne Alvord is the California and Western States Director of the Union of Concerned Scientists (UCS), which is a 250,000-member science-based nonprofit working for a healthy environment and a safer world. UCS combines independent scientific research and citizen action to achieve changes in government policy, corporate practices, and consumer choices. Ms. Alvord previously served as legislative staff to Senator Fran Pavley and to then-Assemblymember Fran Pavley.

Simon Mui, Ph.D is Director of the Vehicle and Fuels Program in California for the Natural Resources Defense Council (NRDC). NRDC is an approximately 40-year-old environmental organization that has as its mission safeguarding the Earth – its people, plants, and animals – and the natural systems on which all life depends. It has over 1.3 million members and on-line activists, 250,000 of whom are Californians.