

# **Climate Impacts in California and Update on AB 32 Implementation**

An Informational & Oversight Hearing of the  
Senate Select Committee on Climate Change & AB 32 Implementation

May 16, 2013 – Upon adjournment of Senate Session  
State Capitol, Room 4203

## **BACKGROUND PAPER**

This informational and oversight hearing will examine the state’s vulnerabilities to climate change, situate the State of California’s ambitious climate change policy agenda within the broader scope of state, national and international climate action, provide an update on the California Air Resources Board’s implementation of AB 32 to this date, and allow members an opportunity to evaluate what priorities should be emphasized as AB 32 moves forward.

### **A “NEW NORMAL” — MOUNTING COSTS OF AN EXTREME CALIFORNIA CLIMATE**

“Perhaps nothing affects national economic welfare so much as the weather.” So remarked Edward Denison, the American economist who pioneered the concept of Gross National Product, on the limits of this measurement. Globally, extreme weather and climate change are already shaving 1.6 percent off worldwide gross domestic product—about \$1.2 trillion per year. If fossil fuels continue to be extracted and combusted at current rates (“business as usual”), California will be forced to confront a “new normal.” The impacts of our increasingly stressed climate are being felt now, with earlier wildfire seasons, more powerful and frequent storms, heat waves, snowpack melt, and droughts. A 2008 study by the University of California, Berkeley and Next10 estimates half a trillion dollars of transportation infrastructure assets are at risk, with annual economic losses of up to \$50 billion in a variety of sectors. For example, public health impacts, which are particularly acute in disadvantaged communities, could total up to \$24 billion per year, primarily due to increases in air pollution related deaths and illnesses.

In 2009, the California Natural Resources Agency adopted a California Climate Change Adaptation Strategy to assess California’s climate vulnerabilities and explore measures to adapt to such risks. The Resources Agency and the Energy Commission have also launched Cal-Adapt.org, a web-based tool for city and county planners, agencies and the public to identify location-specific climate risks. This year, the Resources Agency will be issuing an update to the Adaptation Strategy using the latest scientific data and modeling to provide local, regional and state decisionmakers an even more granular look at potential impacts on the economy, communities, natural resources and infrastructure.

The Committee may wish to consider the following issues, in assessing California’s readiness for extreme weather and other climate change related costs:

- How do the costs of adapting in the long-term, under a business as usual scenario, compare to the costs of more aggressive action to reduce greenhouse gas emissions in the near-term?

- In its update to the Statewide Adaptation Plan, what can the Resources Agency do to provide more granular, actionable information about the potential near and long-term costs and vulnerabilities of climate change on particular regions and sectors of the economy?

## **OVERSEEING AB 32 IMPLEMENTATION—HOW FAR HAVE WE COME? WHAT LIES AHEAD?**

Since AB 32 was enacted in 2006, California has taken major strides in reducing greenhouse gas pollution. California emitted about 43 percent as much energy-related carbon dioxide pollution as Texas in 2010, despite producing about \$600 billion more in annual gross state product over the same period, according to the U.S. Energy Information Administration and the Environmental Protection Agency (EPA). Despite being the largest energy market in the country, California's per capita energy-related carbon dioxide emissions are the fourth lowest in the nation. Since businesses began reporting data in 2008, emissions have steadily declined from 133.4 million tons to 111 million tons of carbon dioxide equivalent over four years, reducing such pollution by 22 percent in 2011 alone. While the co-benefits of statewide greenhouse gas pollution reductions have not been quantified, the state's oil refining sector shows some evidence of progress, with toxic emissions at 7 of the 10 largest oil refineries reported record low levels in 2011, according to the EPA's Toxic Releases Inventory.

To guide its adoption and implementation of regulations to reduce statewide emissions to 1990 levels by 2020, AB 32 requires the California Air Resource Board (ARB) to develop a Scoping Plan to guide the implementation of various emissions reduction measures that are designed to collectively achieve AB 32 targets. The Scoping Plan was first approved by the Board in 2008, and must be updated every five years. In summer 2013, after a series of public workshops, held in coordination with local air and transportation agencies, ARB plans to release a preliminary draft of the Scoping Plan Update for public review and comment. This fall, ARB expects to bring this update to the Board for consideration.

The current Scoping Plan includes a number of statutory and regulatory GHG reducing measures, including emissions performance standards for vehicles, energy efficiency actions, the Renewable Portfolio Standard, SB 375 (Steinberg, 2007) transportation and land use-related emissions reductions, methane regulations for landfills, the cap-and-trade program, and the low carbon fuel standard. The ARB currently projects that about 22 percent of the remaining emissions that must be reduced by 2020 will come from year-by-year reductions in the number of carbon allowances sold or allocated under the cap-and-trade program, while about 50 percent of emissions reductions will be achieved through energy efficiency and direct regulations (e.g. appliance and building standards, the Renewables Portfolio Standard, industrial efficiency, and landfill methane regulation).

The proportionate roles for the various Scoping Plan strategies are constantly evolving. How AB 32 is implemented going forward will depend on how the ARB prioritizes various measures, in accordance with statutory or legal requirements. The Legislature's role in overseeing the implementation of AB 32 is therefore critical at this juncture.

### **AB 32 in Context**

A growing number of states, regions, and nations are enforcing laws to reduce greenhouse gas pollution. Seven of the ten largest economies in the world (California ranks ninth overall) subject their largest pollution sources to an economy-wide cap-and-trade program (Germany, France, the United Kingdom, Italy, California, Australia and Spain). These and other nations couple such policies with

complementary measures such as emissions performance and renewable standards in the power sector, low carbon fuel standards, and energy efficiency.

**Federal Action.** National fuel economy standards, finalized by President Obama in 2012—54.5 miles per gallon by 2025—were prompted by California’s clean cars standards developed under AB 1493 (Pavley, 2002). The 6 billion tons of CO<sub>2</sub> emissions these national CAFE standards are projected to reduce are 75 times more than California is slated to reduce in the remaining years of AB 32, and about as much carbon dioxide as is contained in the technically recoverable oil lying beneath the Monterey Shale.

In the absence of Congressional legislation specifically addressing climate change, President Obama promised, “I will act,” in the 2013 State of the Union. To meet its 2009 commitment to reduce greenhouse gas emissions 17 percent below 2005 levels by 2020, the Obama Administration is evaluating the opportunity to address the nation’s top two stationary sources of greenhouse gas pollution—power plants and oil refineries. Under its legal authority to regulate greenhouse gas emissions as a pollutant under the Clean Air Act, per the Supreme Court’s 5-4 holding in *Massachusetts v. EPA* (2007), the EPA, in 2012, proposed to adopt a California-comparable performance standard for *new* power plants. Since this proposed rule was issued, no new coal-fired power plants have come online in the US (note: the 1000 pounds of CO<sub>2</sub> per megawatt-hour standard constructively bars any new coal power except for a plant equipped with carbon capture and storage technology).

The 600 coal-fired power plants that currently remain in operation are the single largest source of carbon pollution in the country. While Republicans in the US Senate continue to boycott the confirmation of Gina McCarthy, Obama’s nominee for EPA Administrator, and denial of climate change science emerges as a growing concern in the House of Representatives, new modeling from ICF International shows that basic performance standards for existing power plants, comparable to California’s current standards, could generate billions of dollars in economic and public health benefits.

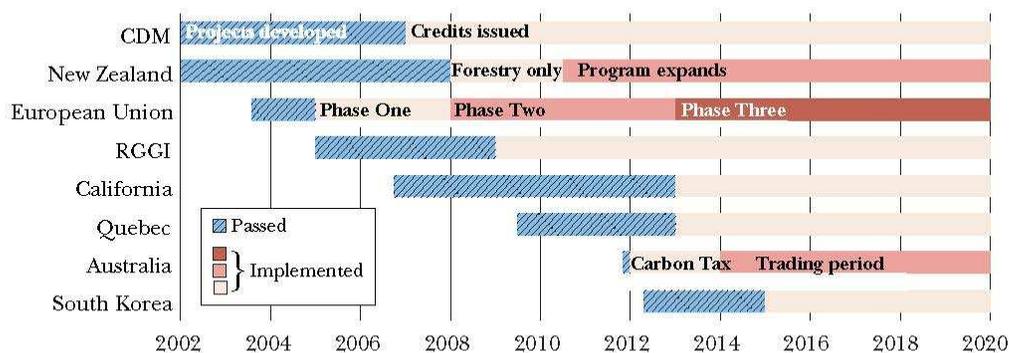
**Regional Progress.** In April 2013, the State of Washington tightened its Carbon Emissions Performance Standard for new power plants. Washington State’s standard is now 12 percent tighter than the California standard it was modeled on, SB 1368 (Perata, 2006). By December 2013, pursuant to a state law signed by Governor Inslee earlier this year, the Legislature will receive recommendations for further actions that should be taken to cost-effectively achieve the state’s AB 32-equivalent goal of reducing greenhouse gas emissions to 1990 levels by 2020. The task force providing these recommendations is required to evaluate “programs being implementing in other states,” including those “reduction strategies being implemented...on the west coast” (Wash. S.B. 5805, Ranker).

**Renewable Energy.** In the United States, states continue to ramp up investments in renewable power. Twenty-nine states and Washington D.C. have adopted mandatory Renewable Portfolio Standards, and eight additional states have renewable procurement goals. Renewable power installations accounted for over 80% of all new domestic electrical generating capacity in the first quarter of 2013. Last week, Warren Buffet’s MidAmerican Energy, announced plans to invest \$1.9 billion in 1 GW of wind power by 2015 after committing to shutter seven coal-fired boilers at three of its Iowa power plants earlier this year. With low natural gas prices, and increasing concerns about water and air pollution from coal production and combustion, the Energy Information Agency projects coal-fired electricity generation will continue to fall as retirements outpace new additions.

**Energy Efficiency.** Investment in energy efficiency continues to expand nationwide. According to a recent study by the American Council for an Energy Efficient Economy, spending on energy efficient goods and services has increased 80% since 2004, delivering 30 million metric tons of CO<sub>2</sub> reduction and economic savings in 2011 alone. Efficiency standards for new buildings, appliances, and automobiles are likewise playing a major role in curbing emissions: appliance standards set by the Department of Energy reduced emissions by roughly 200 million metric tons alone in 2010.

**Cap-and-Trade.** The market-based price on carbon dioxide pollution in California is currently the strongest in the world (California Carbon Allowances are currently trading at about \$14.50 per ton). However, 9 Northeast and Mid-Atlantic states, Australia, New Zealand, South Korea, Quebec, and 27 European Union countries also enforce cap-and-trade programs to reduce greenhouse gas emissions.

Figure 1  
Timeline for Selected Greenhouse Gas Emissions Trading Programs



Source: Authors.

Notes: “CDM” stands for the Clean Development Mechanism, which was set up as part of the Kyoto Protocol. “RGGI” stands for the Regional Greenhouse Gas Initiative, which operates in the northeastern United States.

Source: Newell et al. (2013)

Within the U.S., the nine Northeast and Mid-Atlantic states within the Regional Greenhouse Gas Initiative (RGGI) recently voted to reduce their carbon emissions cap on the power sector by 45% below the cap they established in 2009. Like California, RGGI auctions a portion of emission allowances to large emitters. The states have invested about \$950 million in auction proceeds in a variety of energy efficiency, clean energy and utility bill payment assistance programs, as well as deficit reduction, resulting in \$1.6 billion in economic growth for the region, according to the Analysis Group.

In June 2013, China, the world’s largest greenhouse gas emitter, will launch seven pilot carbon emissions trading programs in various provinces. By 2020, the Chinese government plans to link those regional systems into a national carbon market. In April 2013, the governments of China and Australia announced their intent to link the two countries’ carbon markets into a regional market. China’s entry to emissions trading will surpass California as the second largest carbon market, after the European Union’s Emissions Trading Scheme (EUETS).

While greenhouse gas emissions are down 14 percent in the EU since 2005, an oversupply of allowances in the first phase of the program, coupled with the recent economic downturn, has led to persistently low carbon prices in the EUETS, and the need for future agreement to take some excess allowances off the market, or find other means of providing regulatory certainty of a EU-wide commitment to make major emissions reductions in the future. As European ministers negotiate a solution to this supply glut, countries like the United Kingdom, Sweden and France continue to enforce their own domestic prices on carbon, and the EU as a whole continue to enforce its 20% by 2020 renewable power standard.

### **Beyond Carbon Dioxide: Short-lived Climate Pollutant Reduction Opportunities**

While carbon dioxide is California's largest contributor to climate change, a number of other greenhouse gas pollutants, such as black carbon, methane and hydrofluorocarbons, not only impact the climate but also harm local air quality. The air quality effects are particularly acute in disadvantaged communities, which are often surrounded by industrial activity. Impacts include asthma and other respiratory problems, low birth weights, heart attacks and lung cancer.

These pollutants are known as short-lived climate pollutants (SLCPs) because their climate change effects have strong, but short-lived, radiative forcing effects on the climate, which can last anywhere from a few weeks up to 15 years. Carbon dioxide, on the other hand, remains in the earth's atmosphere for decades but does not have as immediate of an effect on warming.

According to the ARB, SLCPs make up about 21 percent of California's global warming pollution, while 78 percent of the state's greenhouse gas emissions are carbon dioxide. Recent estimates indicate that SLCPs account for almost twice as much of the global share of greenhouse gas emissions—about 37 percent. Because many of the emissions sources of SLCPs are largely unregulated and are often not required to report actual emissions (e.g. fugitive methane emissions from natural gas distribution, hydraulic fracturing and other forms of petroleum production, landfills and dairy production, or black carbon from biomass used for cooking in developing nations), these estimates are constantly being revised and updated based on new data.

Black carbon, a component of soot that comes from diesel engines and other industrial sources, is California's largest source of SLCPs and the state's second largest contributor to global warming. California already has several tools for reducing black carbon, some of which predate AB 32, and are designed to address the non-climate air quality effects of this pollutant. Available tools include tailpipe emissions standards (Low Emission Vehicle III), diesel engine standards for both mobile and stationary sources (Diesel Risk Reduction Plan), agricultural burning restrictions, vehicle testing capabilities and a targeted research program. Despite dramatic reductions in emissions, black carbon continues to contribute to climate change and threaten public health and safety, particularly in areas such as the Central Valley and the Los Angeles Basin.

Methane, a greenhouse gas that is about 72 times more powerful as global warming pollutant than carbon dioxide (on a 20 year basis), also affects local air quality. Methane sources in California include livestock, landfills, and oil and gas production and distribution. The ARB adopted a discrete early action measure under AB 32 for municipal solid waste landfills in 2009, as well as dairy digester

offset protocols (for manure management) in 2011. The Board is considering regulations in 2013 to address methane emissions from oil and gas production, transmission and distribution, which could include emissions from hydraulic fracturing of oil shale.

The Committee may wish to consider the following issues in evaluating priorities for AB 32 implementation going forward:

- Which elements of the 2008 Scoping Plan have yet to be fully implemented? The Scoping Plan, for example, includes a number of measures to reduce methane in the recycling and waste sector, as well as in the industrial sector, specifically recommending actions for refinery flare improvements and more efficient oil and gas extraction.
- Has the Air Resources Board, or other state agencies, implemented all cost-effective, technologically feasible direct regulatory measures to address carbon dioxide (e.g. mandatory large facility industrial audits, emissions performance standards for power plants)?
- What near-term options does the state have to implement cost-effective, technologically feasible measures to address SLCPs to achieve greenhouse gas, toxic and criteria pollution goals?

\* \* \*

### **Witness Biographies**

Dallas Burtraw is a Darius Gaskins Senior Fellow at Resources for the Future, a nonprofit and nonpartisan organization that conducts independent research on environmental, energy, natural resource and environmental health issues. Burtraw recently served on the National Academy of Sciences Board on Environmental Studies and Toxicology and on the U.S. Environmental Protection Agency's Advisory Council on Clean Air Compliance Analysis. He also served on California's Economic and Allocation Advisory Committee to advise on the implementation of AB 32.

Dr. Marc Fischer is staff scientist in the Sustainable Energy Systems group and Environmental Energy Technology Division at the Lawrence Berkeley National Laboratory (LBNL), and is an adjunct associate research scientist at the Air Quality Research Center at the University of California, Davis. Fischer's work focuses on atmospheric studies of natural and anthropogenic processes affecting greenhouse gases (and other atmospheric constituents, and development of sustainable solutions to energy and environmental problems. Fischer and colleagues are quantifying the sources of California's GHG emissions, their long-term trends, and identifying cost-effective options to mitigate emissions.

Dirk Forrister is the Chief Executive of the International Emissions Trading Association. Forrister spent the previous decade as Managing Director of Natsource, LLC, where he managed one of the world's largest climate action funds. Previously, he served as Chairman of the Clinton Administration's White House Climate Change Task Force during the Kyoto Protocol negotiations, Assistant U. S. Secretary of Energy for Congressional, Public and Intergovernmental Affairs.

John Laird is the California Secretary of Natural Resources, a post he was appointed to by Governor Jerry Brown 2011. He has spent 35 years in public service, including 23 years as an elected official. Laird was a member of the State Integrated Waste Management Board from 2008 to 2009. Most recently, he taught state environmental policy at University of California Santa Cruz.

Mary Nichols is Chairman of the California Air Resources Board, a post she has held since 2007. In addition to her work at the Air Board, she has served as Assistant Administrator for the U.S. Environmental Protection Agency's Air and Radiation program under President Clinton, Secretary for California's Resources Agency from 1999 to 2003 and Director of the Institute of the Environment at the University of California, Los Angeles.

Dr. Linda Rudolph is the Co-Director of co-director of the Climate Change and Public Health Project in PHI's Center for Climate Change and Public Health. Previously, she served as the deputy director of the California Department of Public Health (CDPH)'s Center for Chronic Disease Prevention and Public Health and the health officer and public health director for the City of Berkeley, CA. While at CDPH, Rudolph chaired the Strategic Growth Council Health in All Policies Task Force and the California Climate Action Team Public Health Work Group.