Air Resources Board Written Testimony on the Use of Economic Analysis in the Regulation Development Process

Little Hoover Commission Hearing
January 27, 2011

I. Introduction and Legal Obligations

The Federal Clean Air Act requires states to develop and implement plans (State Implementation Plans or "SIPs") to achieve air quality standards by specified deadlines. The federal air quality standards represent the maximum level of an air pollutant in the ambient environment that the U.S Environmental Protection Agency determines is protective of public health. The SIPs must identify the sources of air pollution contributing to violations of the standard, and include enforceable regulations to reduce emissions from these sources. The California Air Resources Board (ARB or Board) is tasked with overseeing implementation of California's SIP, including the adoption of necessary regulations. On the state level, Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, requires California to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. AB 32 required ARB to develop the 2008 Scoping Plan which identifies how California will reduce GHGs to the required level though ARB regulations and other actions. In all programs, ARB's goal is to design regulations that result in the fulfillment of the statutory mandates in the most cost-effective manner.

ARB has a legal obligation to analyze the economic impacts of all proposed regulations. Section 11346.3 of California's Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any regulation. The assessment is required to include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation, and the ability of California businesses to compete with businesses in other states.

Also, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate is required to include any non-discretionary cost or savings to local agencies and the cost or savings in federal funding to the State.

Finally, Health and Safety Code section 57005 requires the ARB to perform an economic impact analysis of submitted alternatives to a proposed regulation that are equally effective, before adopting any major regulation. A major regulation is defined as a regulation that will have a potential cost to California business enterprises in an amount exceeding ten million dollars in any single year.

ARB has a long history of assessing cost-effectiveness of regulations calculated as the cost per ton of reduced air pollutant emissions. The cost-effectiveness assessment provides the Board a benchmark for the cost of proposed regulations relative to its previous regulatory actions. Multiple cost-effectiveness analyses may be done in the rule development process as regulatory concepts are refined and public comment incorporated.

The Board also considers the overall cost of regulations as well as the environmental, public health, and other benefits of proposed actions. Because of the federal mandate to achieve a specified quantity of emission reductions, the ARB staff analyses focus on cost-effectiveness and any alternatives which would provide the same reductions at a lower cost.

The ARB economics unit is charged with conducting economic impact analysis for all ARB regulations, as well as providing help and advice to other Cal/EPA programs. The economics staff promotes consistent analytical approaches among the boards, departments and offices of Cal/EPA. The level of analysis done for other Cal/EPA programs depends upon the nature of the request and available data. Analysis of proposed ARB's regulations comprises the majority of the workload.

II. Nature of Analyses and Tools

A. Use of the Best Tools Available

As described earlier, ARB is legally obligated to analyze the economic impacts on a number of different parties impacted by a proposed regulation. ARB staff estimates the economic and fiscal impact of proposed regulations on different groups. These groups include businesses, small businesses, individuals, and impacted communities. ARB staff also examines the impact on the entire California economy, including directly and indirectly impacted industry sectors.

There are a number of approaches used by ARB staff to examine the impact a regulation may have on different parties. This section describes which parties may be impacted and what tools ARB staff uses to determine the impacts.

1. Typical Business Impacts

ARB staff estimates the impact on California businesses by estimating the compliance cost for a typical business. This takes into consideration new or increased costs such as new or upgraded equipment required, increases in labor, or increases in input costs. Staff also takes into consideration any cost savings that may result from the regulation. Cost savings may result from increases in energy or other process efficiencies or from using a less expensive technology. The cost of compliance is examined relative to current operating

costs of a typical business to determine the impact the regulation may have on a business.

When examining the impact on businesses, staff also considers business activity creation, elimination, expansion, or reduction resulting from the regulation. Changes in business activity cause changes in employment as well. New regulations may cause an increase in expenditure on items that create jobs, or a decrease in expenditures on other items that decrease jobs. To quantify this impact, staff estimates the number of jobs created or eliminated by the regulation using modeling and employment data from various sources.

Data sources for employment information include the California Employment Development Department, California Department of Finance, the Federal Bureau of Labor Statistic, and others. Most sources receive their employment data through state and federal census, surveys, and other data collection methods. Depending on the source, they are updated annually, quarterly, or sometimes monthly.

2. Small Business Impacts

The impacts of compliance costs or cost savings are also evaluated for California's small businesses. In general, a small business is defined in the California Administrative Procedure Act as a business that has less than 100 employees or less than one million dollars in sales per year. Sometimes these businesses may not be able to absorb or pass on compliance costs in the same way large businesses can.

Data for small businesses are available through a number of government and industry association sources. ARB also contracts with research companies that hold proprietary business information such as Hoovers and Dunn and Bradstreet. Through these companies ARB can access small business financial records, employment data, and other information to inform regulatory impact analysis.

3. Business Competiveness

It is important to examine how regulations affect California's business competitiveness. The regulatory climate in a state can have an affect on the cost of doing business as well as which customers a business can serve. New regulations may reduce or enhance competitiveness of California business enterprises. ARB staff studies how the cost of doing business will change in California due to a regulation and if this change will affect any current competitive advantage or disadvantage California businesses already have. If businesses can pass on the compliance cost or increase efficiency in a way that offsets compliance costs, then competitiveness is not affected.

4. Individuals

As part of the economic analysis staff also estimates the impact a regulation will have on individuals. The economic impact on individuals results primarily from businesses passing all or part of the compliance cost on to their customers. Businesses do this by increasing the price of their goods or services. Also, in the case of regulations that affect the cost of electricity or fuel, individuals may be directly impacted through rate or price changes. If costs are passed onto consumers this may affect their spending behavior in other sectors of the economy as well.

5. Macroeconomic Analysis

For large regulations a macroeconomic analysis is conducted. First, staff must identify the California industry sector(s) that is directly impacted by the regulation. This is usually the sector that bears the compliance cost. Once the compliance cost is estimated staff uses a macroeconomic model to estimate the impact this cost will have on the entire economy. Macroeconomic impacts include changes in factors such as state output, gross state product, state personal income, and employment.

a. Model of California Economy

To capture and assess impacts on businesses, ARB staff uses the Environmental Dynamic Revenue Analysis Model (EDRAM) of the California economy for overall macroeconomic impacts which feed into determination of business impacts.

EDRAM is a computable general equilibrium (CGE) model of California developed by Professor Peter Berck at the University of California, Berkeley, and the California Department of Finance. It has been used for the last two decades by ARB for assessing the economic impacts of major regulations by ARB. The model represents 120 California industrial sectors and is capable of assessing impacts on total economic activity, personal income, employment, gross state product, and several other economic indicators. These indicators describe the overall economic impacts of the proposed regulation and potential for business creation, expansion, or elimination.

As a CGE model, EDRAM is designed to capture the fundamental economic relationships between producers, consumers, and government. CGE models are not forecasting models; they are calibrated to reproduce the economic conditions of a base year. The data set in EDRAM is updated every four to five years. The latest version of EDRAM has recently become available and will be used for upcoming analyses.

The EDRAM describes the relationship among California producers, California households, California governments, and the rest of the world. Rather than tracking each individual producer, household, or government agency in the economy, however, EDRAM combines similar agents into single sectors. That is, the EDRAM, like all other empirical economic models, treats aggregates rather than individual agents.

For industrial sectoring purposes, all California firms making similar products are lumped together. The fabricated structural metal manufacturing sector (manufacturing), for example, contains all California firms producing metal manufacturing products. The output value of that sector is the value of all metal manufacturing firms in California. A sector's labor demand is the sum of labor used by all firms in the sector. Along with manufacturing, there are 119 other producer aggregates in the model. These aggregates generally represent the major industrial and commercial sectors of the California economy. In summary, firms, also known as producers, are aggregated into industrial sectors, and each sector is modeled as a competitive firm.

6. Form 399

The Form 399 is a standard economic and fiscal impact statement completed for every proposed regulation. This form provides a standard template to present data regarding the economic and fiscal impacts to the public, businesses, and federal, state, and local governments. For major regulations the Form 399 also contains information on the impacts of regulatory alternatives. ARB economic staff assists technical staff with completing this form. After completion it is reviewed and approved by the ARB Executive Officer, Cal EPA, and finally sent to the Department of Finance (DOF). DOF staff then work with ARB staff to answer any questions that DOF may have, and if necessary, to modify the analysis. The Form 399 provides a standard presentation for what is often complicated economic and fiscal information. The details of the economic analysis are found in the staff report ("initial statement of reasons") for a proposed regulation.

7. Timing of Analysis

Often, a regulation is not scheduled to be fully implemented for a number of years in the future and the full economic impact is not realized until the regulation is fully implemented. When this is the case, the economic impacts are estimated for the year the regulation is implemented. This is done in a number of ways. If a specific model is being used to estimate impacts, the model must be calibrated to the implementation year. State economic forecasts can also be used to get an idea of what economic activity may look like in the implementation year.

8. Economic Forecasting

Economic forecasting is needed to help define emission forecasts. It is necessary to forecast what the economy will look like in the future in order to estimate demand for transportation, manufacturing, and other emitting sectors. Emissions forecasts are needed to define the quantity of emission reductions needed to comply with the federal Clean Air Act and AB 32 goals, and to help develop cost-effective regulatory strategies. ARB does not develop economic forecasts in-house. ARB staff does, however, conduct sensitivity analyses and bounding exercises to help define emissions forecasts.

B. Develop Specialized Tools Where Needed

Many regulations heavily impact one specific industry. When this is the case ARB staff may use tools that model that specific industry to get a better idea of what the impacts may be. Models can provide insights into price changes, shifts in supply and demand, as well as analyze alternatives to a regulation.

1. CARBITS

CARBITS is a response model for the light-duty vehicle (LDV) market in the State of California. The original version was developed by Professor David Bunch at the UC Davis Institute of Transportation Studies to support policy analysis related to California's AB 1493 legislation on motor vehicle greenhouse gas emissions. The model was developed to evaluate automaker claims that additional vehicle regulations would increase prices and depress sales, and in turn increase total emissions. Since then the model has been extensively revised with the most recent version slated for use in determining economic impacts of the upcoming Low Emission Vehicle III (LEV III) regulatory proposal.

The model integrates market response and demographic sub-models to simulate the behavior of the California personal LDV market over a multi-year period. Based on household preferences, assumptions about fuel prices, and inputs on vehicle attributes (e.g. vehicle price, fuel economy, body style, acceleration time) CARBITS projects the number and type of vehicles. Importantly, the model includes both new and used vehicles which allow for analysis of fleet turnover as a result of different policy proposals. In addition, CARBITS distinguishes between different household types to allow for examination of equity issues.

2. ENERGY 2020

ARB has developed a number of analyses for policies that impact California's energy sector, including the analyses of the AB 32 Scoping Plan and Cap-and-Trade program. For these analyses *ENERGY 2020*, developed by System Solutions Incorporated (SSI), was used to support a more detailed analysis of the economic impact of energy-related measures.

ENERGY 2020 is an integrated multi-region energy model that provides complete and detailed simulations of the demand and supply picture for all fuels. The model simulates demand by three residential categories, over 40 North American Industrial Classification System (NAICS) commercial and industrial categories and three transportation services. Supply sectors include electricity, oil, natural gas, refined petroleum products, ethanol, landfill gas, and coal supply. *ENERGY 2020* can provide insight into changes in fuel prices associated with allowance prices, emissions reductions by year and sector, changes in fuel expenditures by year and sector, and changes in investment by year and sector.

3. RES Calculator

For the Renewable Electricity Standard (RES), ARB contracted with Energy and Environmental Economics (E3) to provide insight into the cost and economic impacts of the regulation. E3 developed the RES calculator which is an economic-based model developed to estimate the costs and feasibility of procuring conventional and renewable energy for California utility companies to meet a potential 33 percent renewable energy standard in 2020.

For analysis of RES, ARB collaborated with the California Energy Commission (CEC), the California Public Utilities Commission (CPUC), and the California Integrated System Operator (CA-ISO) to gather the most complete data set and fully understand the State's electricity grid. The RES Calculator is based on a calculator developed for the CPUC's *33% Renewables Portfolio Standard Implementation Analysis*. This calculator was also developed by E3.

The RES Calculator evaluates electricity supply and demand information from the California energy agencies, ARB, the Energy Information Administration, consultants, stakeholders, and the Renewable Energy Transmission Initiative (RETI), among other sources, to select a least-cost renewable resource mix that is compatible with existing and planned transmission goals. This task is conducted by selecting a mix of renewable resources based on current California utility contracting activity and the costs, environmental impacts, and energy output associated with developing resources and delivering them to one of two major load centers in California. The RES Calculator also provides the capability to specify a number of inputs such as a reduction of load demand due to changes in energy efficiency, the availability of out-of-state resources, and the costs of renewable resources, making it an effective tool for forecasting renewable resources that can be integrated into a reliable California electricity system in 2020.

The RES calculator estimates the total revenue requirement and average rate impact to reach 33 percent renewable energy in California in 2020. This cost impact information was then input into EDRAM to estimate the total statewide economic impacts of the RES.

C. Expand Existing Datasets

When the necessary information is not available to develop a robust economic analysis it may be necessary for ARB staff to collect new data. This can be done in a variety of ways. One option is for staff to directly contact affected parties, which was done with the 2010 amendments to ARB's diesel truck rule. Another option is to initiate new contracts with private data collectors, such as Dunn and Bradstreet.

1. Stakeholder Survey

As part of the 2010 amendment process for the ARB's diesel truck regulation, staff prepared a survey questionnaire to collect financial and business data from affected truck fleets. ARB staff prepared an analysis of their financial conditions, and compared the financial ratios of affected fleets with financial ratios of five large publicly traded companies in transportation and construction. Comparisons of the financial conditions of small and large companies showed how both groups of companies were affected by the recession.

2. Data and Research Contracts

New and updated data is a key piece to timely and accurate economic analyses. In order to obtain this data ARB contracts with private data collection firms, such as Dunn and Bradstreet and Hoovers. Both firms collect proprietary business and market industry data including business locations, financial statements, employment numbers, corporate affiliations, industry-wide statistics, etc. This data can be used to profile a typical business in an industry and then estimate the impacts of a regulation on an individual or small business level.

ARB also works with leading academics in the environmental economics field to have access to the latest modeling techniques and tools. Academia often has a good working relationship with industry and can collect data from businesses and individuals to model their behavior. ARB's works closely with the University of California system to allow for introduction of new data and tools into its economic analysis process.

III. Comprehensive Public Process

A. Mechanism for Public Input

Stakeholder input is an important and valued part of ARB's regulatory process. The adoption of an ARB regulation is often a multi-year, iterative process that allows many opportunities for public comment. ARB staff seeks to involve the stakeholders early in the development of the regulation, long before any formal regulatory proposal is made under the California Administrative Procedure Act. Early public input allows ARB staff to evaluate information provided by

stakeholders, and to refine analyses of preliminary proposals before a formal regulatory proposal is considered by the Board in a public hearing.

During the development of a proposed regulation, staff holds multiple public workshops to solicit stakeholder input. Stakeholder suggestions are considered throughout the rule writing process, and staff often meets with industry stakeholders on an individual basis to obtain more information.

Once the regulation is written and staff releases its Initial Statement of Reasons for the rule a 45-day comment period begins. This occurs 45 days before the rule is considered by the Board at a public hearing. During these 45 days, the public may submit comments by mail or via the ARB website. These comments go into the public record and all comments must be responded to in writing. The public also has the opportunity to verbally provide comments on a specific rule directly to the Board at the Board hearing.

Sometimes the Board requests staff to make changes to the proposed regulation after it is presented at the hearing as a result of public concerns or comments. If this happens, staff will make the necessary changes and release the updated regulatory language to the public again. At this time stakeholders will have a 15 day period where they may submit comments on the changes. Sometimes there are multiple 15 day comment periods, if other concerns or issues are brought to light through public input.

B. Peer Review and Advisory Committees

To solicit input from sources outside the agency ARB may submit research for peer review or form advisory committees comprised of individuals knowledgeable in the industry being regulated. For example, the Economic and Allocation Advisory Committee (EAAC) was assembled to provide advice on the implementation of AB 32, including the cap-and-trade program. The EAAC comprises economic, financial, and policy experts with various backgrounds and experiences. On cap-and-trade, it provided advice on allocation of allowances and use of their value. Members of EAAC participated in a public workshop with other economists to provide input to the Board and the public.

C. Assembly Bill 1085

Assembly Bill 1085 requires the ARB to provide the public all of the information relied on by staff in proposing the adoption, amendment, or repeal of a regulation, including all information related to, but not limited to, air emissions, public health impacts, and economic impacts. ARB complies with this requirement by making a variety of information available to the public. For economic analyses all non-proprietary data and modeling tools used are available on the ARB website. This includes information on data sources, model

inputs and outputs, methodology and any other information that was used to estimate the economic impacts of a regulation.

IV. Opportunities for Improvement or Expansion of Analysis

ARB is continuously looking for opportunities to improve its impact assessment tools and expand its data sources. In an effort to strengthen ARB's economic analysis program, a process is underway to create a new academic fellowship through the University of California. The goal of the fellow program is to assist in improving the quality, scope and usefulness of economic analysis at ARB. The fellow will serve as a liaison between the agency and academia, and help ARB stay abreast of the latest economic modeling techniques and tools. The ability to bring experienced economists into the state system is a challenge, and while the fellowship will help other solutions are also needed.

As described earlier, ARB's efforts focus on the legal requirements for economic analysis, and designing regulations to achieve mandated clean air goals in the most cost-effective manner. The question of doing broader cost-benefit assessments is directly linked to the statutory mandates of the federal Clean Air Act. The U.S. Environmental Protection Agency is required to set national air quality standards to protect public health and welfare with a margin of safety, without consideration of the costs of implementation. States must implement the national standards, and would not be relieved of that obligation on the basis of a cost-benefit assessment. However, through the public hearing process, the Board has a long history of considering both the potential benefits and any negative impacts of proposed regulatory actions. Under State law the Board is comprised of individuals from various disciplines and experience, including local agency representatives. This breadth of expertise and representation, combined with the ARB regulatory development process, helps ensure broader societal issues are identified and considered in Board decision-making.