

## **CHAPTER 1**

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### **INTRODUCTION**

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## **INTRODUCTION**

The draft 1997 Air Quality Management Plan (AQMP or Plan) is designed to meet the challenge of achieving clean air in Southern California. The Plan proposes strategies and programs aimed at both a healthy environment and economy. The costs of implementing this Plan and the associated benefits of achieving clean air standards are the subject of this report. The purpose of this assessment is to define and present the potential socioeconomic impacts related to the draft 1997 AQMP.

### **1997 AQMP**

The 1997 AQMP is a comprehensive plan designed to achieve federal ambient air quality standards for the South Coast Air Basin (Basin) and those portions of the Mojave Desert Air Basin and the Salton Sea Air Basin that are under the District's jurisdiction (namely the Antelope and Coachella valleys). This revision began with the control strategies in the 1994 ozone State Implementation Plan (SIP), then expanded potential market-based control strategies and placed a greater emphasis on the common precursors to ozone (NO<sub>x</sub> and VOCs) and particulate matter (PM).

Short-, intermediate- and long-term control strategies are proposed and would be implemented by the District, local and regional governments, the California Air Resources Board (ARB), and the U.S. Environmental Protection Agency (EPA). The short- and intermediate-term strategy is made up of control measures that rely on known technology and are proposed to be implemented between 1997 and 2005. While implementation of these measures provides considerable improvements in air quality, further emission reductions are needed to ultimately achieve ambient air quality standards. Therefore, the Plan also proposes several long-term measures to be implemented between 1997 and 2010. These measures rely on the advancement of technologies that are currently unavailable for commercial use but are "on the horizon" of development.

The implementation of short-, intermediate-, and long-term measures will produce both direct and secondary positive and adverse impacts on the community and economy of the four-county region. Direct impacts include costs such as expenditures on pollution control equipment, transportation infrastructure, and reformulated products. Direct impacts also include benefits such as decreased medical costs due to better air quality and increased crop yields. Secondary impacts are the impacts of direct costs and benefits on employment, prices, and disposable income. Secondary impacts occur as a result of interactions between industries and consumers in the four-county region.

## **LEGAL REQUIREMENTS**

As part of the 1989 AQMP approval, the District Governing Board passed a resolution that called for District staff to prepare an economic analysis of emission reduction rules proposed for adoption or amendment. Elements to be included in the analysis include identification of affected industries, cost-effectiveness of control, and public health benefits.

In addition, Health and Safety Code Section 40440.8, which took effect on January 1, 1991, requires a socioeconomic analysis of each District rule that has significant emission reduction potential. In addition to the elements required under the District's resolution, Health and Safety Code requires the District to estimate employment impacts and to perform socioeconomic analyses of the project alternatives developed pursuant to the California Environmental Quality Act (CEQA).

Health and Safety Code Section 40728.5 requires that the Governing Board actively consider any socioeconomic impacts in its rule adoption proceedings. Health and Safety Code Section 39616 requires the District to ensure that any market incentive strategies it adopts result in lower or equivalent overall costs and job impacts, (i.e., no significant shift from high-paying to low-paying jobs), when compared with command-and-control regulations. Health and Safety Code Section 40920.6 (Assembly Bill 456), which became effective on January 1, 1996, requires that incremental cost-effectiveness (difference in costs divided by difference in emission reductions) be performed whenever more than one control option is feasible to meet control requirements.

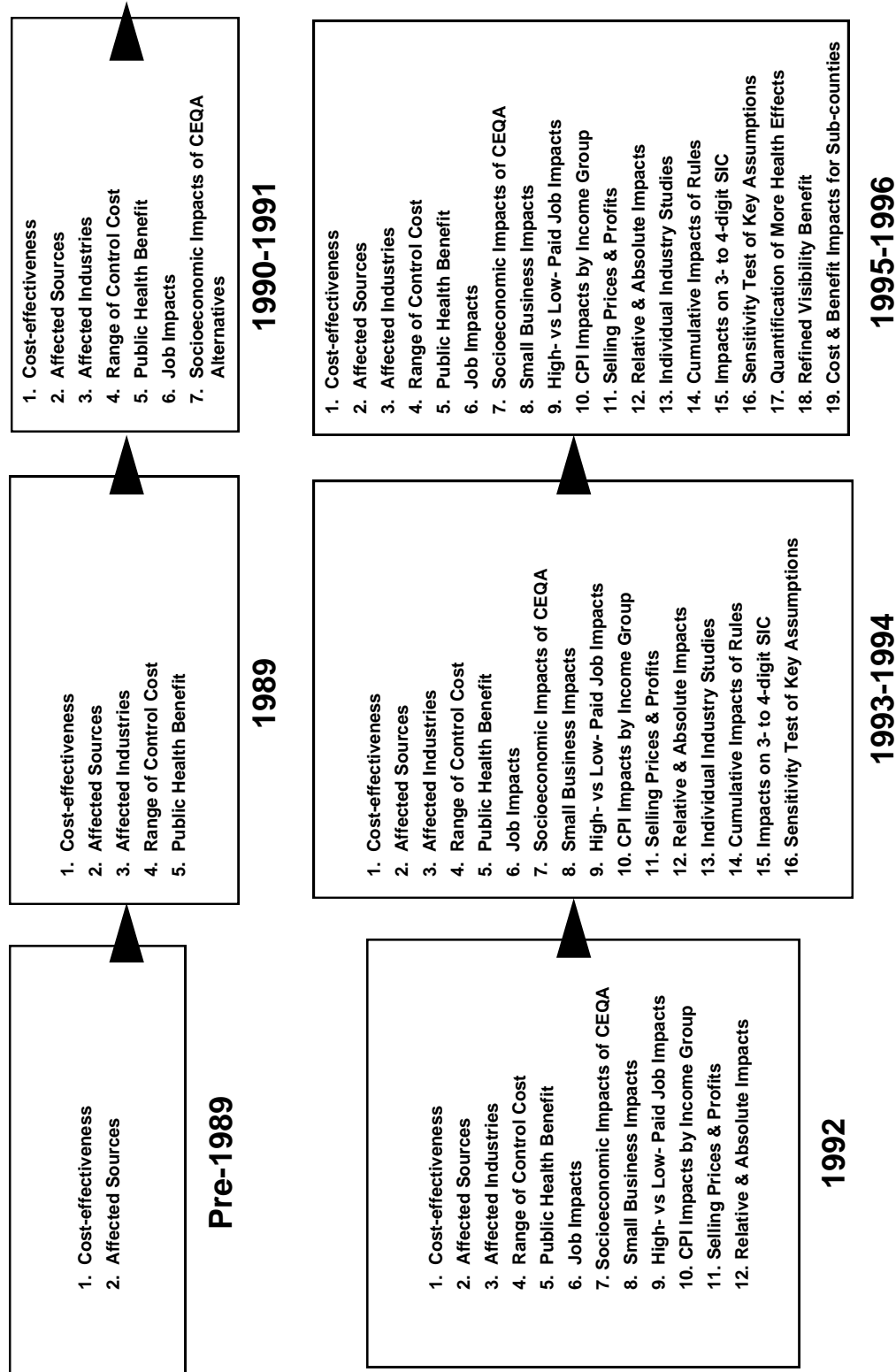
None of these requirements apply to the preparation of the AQMP. However, the District has elected to perform a socioeconomic analysis of the Plan in order to further inform public discussions of the Plan.

### **Current Socioeconomic Analysis Program**

The District continually seeks to improve its analysis of socioeconomic impacts by expanding its methods and tools. Over the years, the District's socioeconomic analyses have diversified and evolved as shown in Figure 1-1. The District relies on both quantitative and qualitative analyses, describes impacts in absolute and relative terms, and has continually refined its analysis to a more detailed level. In addition, the District is beginning to use industry surveys to better identify potential impacts and the underlying socioeconomic characteristics of affected industries.

The Massachusetts Institute of Technology (MIT) conducted an audit of the District's socioeconomic impact analysis program (Polenske et al., 1992). This audit found that the District surpassed most other agencies in analytical methods. The audit did, however, recommend that the District use alternative approaches and work with the regulated community and socioeconomic experts to refine its socioeconomic assessments. The District has been working with a Socioeconomic Technical Review Committee (SETRC) and an Ethnic Community Advisory Council (ECAC) to refine the socioeconomic assessments. The SETRC is composed of leading experts in the socioeconomic field, representatives from the regulated community, and participants from public interest groups. The ECAC consists of representatives from community groups, small businesses, and grass roots organizations who work extensively with their communities.

**Figure 1-1**  
**Evolution of Socioeconomic Analysis**



## 1997 AQMP SOCIOECONOMIC ISSUES

In addition to covering all the topics listed under the legal mandates above, this assessment will address the following issues and best estimates of:

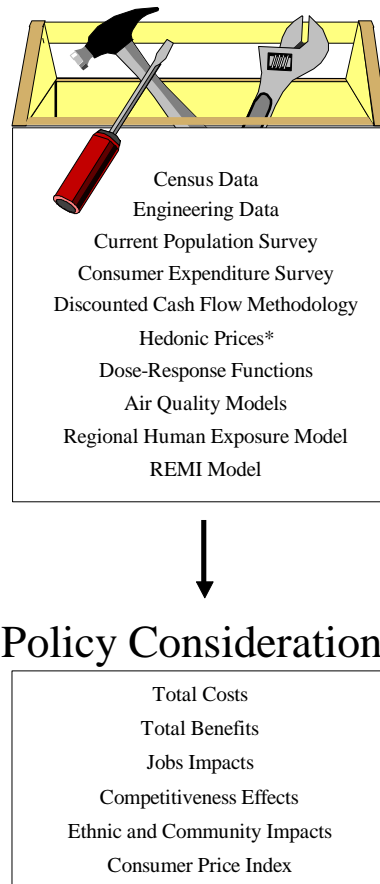
- Benefits of the 1997 AQMP;
- Total implementation cost of the 1997 AQMP;
- Cost of the 1997 AQMP as compared to the benefits;
- Effect the Plan will have on employment;
- Potential impacts on sub-county areas and socioeconomic groups;
- Effect the plan will have on industrial competitiveness;
- Economic effects of the alternatives to the proposed 1997 AQMP; and
- Key areas of uncertainty in this assessment.

## ASSESSMENT METHODOLOGY

To assess the socioeconomic impacts of the draft 1997 Plan, the District has relied on a variety of methods and tools (Figure 1-2). The interrelationship between these tools and methods is shown in Figure 1-3. A two-step process is employed to estimate the costs of the Plan. The first step involves the quantification of the Plan's impact based on those feasible measures for which cost estimates can be developed at this time. The discounted cash flow method is used to estimate the cost per ton of pollutant reduced for each control measure. The second step involves the projection of control costs relative to those remaining short-, intermediate-, and long-term measures in the Plan. In this second step the average cost-effectiveness for quantified control measures is used as a surrogate cost for unquantified measures. That methodology is likely to over-predict costs if one considers the likelihood that costs will come down as technology advances over the years.

A two-step process is also utilized to estimate the benefits expected from implementing the draft 1997 AQMP. The methodology employed, however, is a distinctly different approach from that used to estimate and project the Plan's costs. To estimate benefits, the first step involves translating the improvements in air quality expected to result from the Plan into dollar values. The benefit categories for which there are quantified relationships with air quality include crop yields, improved human health, the public's willingness to pay for improved visibility, reduced damage to building materials, and reduced vehicle miles traveled. Established dose-response relationships and air quality data from different air quality models are used to assess the benefits. The second step involves qualitatively describing the remaining types of benefits that would result from implementing the Plan, but for which monetary benefit estimates are unavailable. A sensitivity analysis is used for this latter evaluation to provide perspective to potential benefits which are not quantifiable at this time.

**FIGURE 1-2**  
Assessment Tool Kit



\*See Glossary

To estimate job impacts and other secondary impacts that may result from the quantifiable measures and benefits, the REMI (Regional Economic Models, Inc.) 214-sector model is utilized. Figure 1-4 shows an example of how the REMI model can be used to assess the socioeconomic impact of a policy. Both the cost and benefit impacts are developed outside of the REMI model and are used as inputs to the REMI model. The REMI model incorporates state-of-the-art modeling techniques and the most recent economic data. The MIT report conducted on the District's socioeconomic assessments found that the REMI model is "technically sound."

The job impact of control measures for which specific cost data are unavailable were projected, based on the REMI model results for quantifiable control measures. Appendix A provides a more detailed discussion of the assessment methodology.

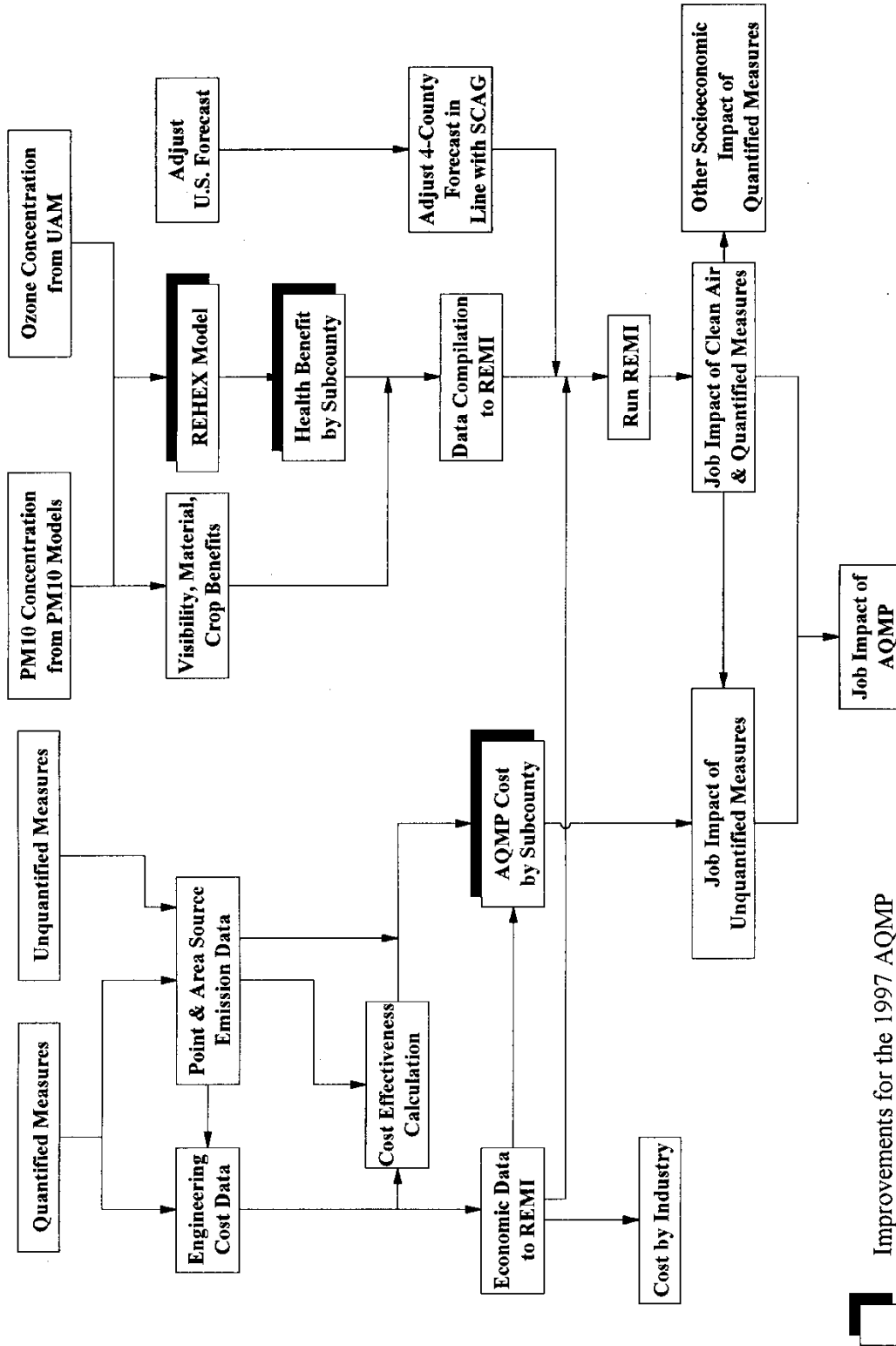
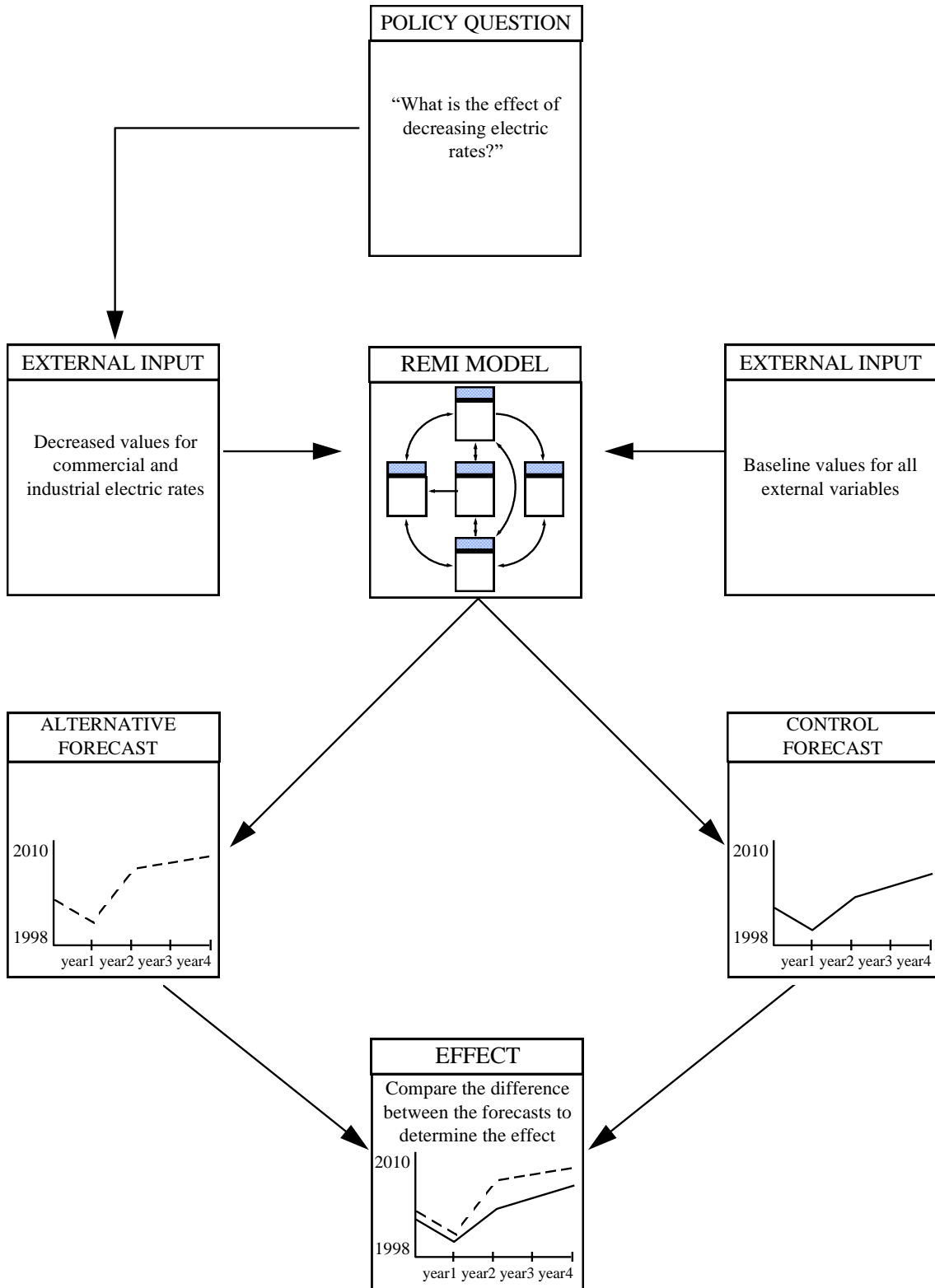


FIGURE 1-3  
AQMP Socioeconomic Analysis

Improvements for the 1997 AQMP

**FIGURE 1-4**  
Use of the REMI Model





To assess the impacts on socioeconomic groups, the impacts on product prices from the REMI model are overlaid on consumption patterns of various income groups to examine the changes in consumer price indexes of these income groups. The data on consumption patterns are from the Bureau of Labor Statistics' Consumer Expenditure Survey. Based on an extensive literature review and survey data on job displacement and re-employment rates of various ethnic groups, the ethnic distribution of the workforce in various industries is adjusted to account for differences in displacement by ethnic group.

To assess the impacts on competitiveness of the four-county region, the following were considered: the region's share of national jobs in those industries whose products are also sold in the national market, the impacts of the draft Plan on product prices and profits by industry, and the changes in imports and exports as a result of implementing the Plan's measures. These factors are selected based on a review of effects of past public policies on a region's competitiveness.

It is not possible at this time to quantify the costs associated with every control measure or the benefits associated with every effect of clean air. Of the 45 control measures with quantifiable emission reductions, 28 have quantifiable costs. Costs for the other measures are not available at this time because control methods, control efficiencies, emission reductions, or costs of control technologies for those measures are not presently known and cannot reliably be projected. The REMI model, used to analyze the impact of the 1997 AQMP, projects possible impacts on jobs, the distribution of jobs, income, product prices, profits, exports, and imports based upon the input of cost data for each control measure and benefit data for each effect of clean air. The reliability of such projections is dependent upon the validity of the input.

For purposes of fully identifying the broad potential cost and employment impacts of the draft Plan, the District projects the overall cost and employment impacts of the draft Plan based on the emission reductions of quantified and unquantified control measures: the cost and job impacts of quantified measures: and the estimated cost and job impacts for unquantified measures. As described above, the estimated cost and job impacts are based on the average cost-effectiveness identified for quantified measures. The more detailed projections of potential impacts relative to income, ethnic groups, and competitiveness are, however, made only for those measures whose costs and benefits can be quantified.