LAO
65 YEARS OF SERVICE

May 13, 2010

Hon. Dan Logue
Assembly Member, Third District
Room 2002, State Capitol
Sacramento, California 95814

Dear Assembly Member Logue:

This responds to your request that we conduct a qualitative analysis of the costs of California taking actions to address the climate change issue, without there being a shared consensus and involvement across the nation in terms of how the issue is addressed. You specifically indicated an interest in the costs California would likely incur following the implementation of AB 32 through the California Air Resource Board's (ARB's) Scoping Plan (SP), compared to states that do not have similar policies in place.

In our analysis below, we:

- Identify the main economic effects that implementation of the SP will likely result in, including the important concept of "economic leakage."
- Discuss the various factors that will determine how significant the economic leakage problem might be, including steps the state could take to minimize economic leakage.
- Conclude with our overall assessment of the costs the state will likely incur by implementing the SP without there being a national consensus about what climate policy should be.

Principal Findings. California's economy at large will likely be adversely affected in the near term by implementing climate-related policies that are not adopted elsewhere. This is in large part because such policies will tend to raise the state's relative prices for energy, such as electricity. This, in turn, will adversely impact the state's economy through such avenues as causing the prices of goods and services to rise; lowering business profits; and reducing production, income, and jobs. These adverse effects will occur in large part through economic leakage, as certain economic activity locates or relocates outside of California where regulatory-related costs are lower. While it is true that there will be both winners and losers under the SP, including gains in so-called "green" jobs, the net economy-wide impact in the near term of implementing the SP in the absence of like policies in place elsewhere will in all likelihood be negative. Compared to the size of California's economy, however, these adverse impacts likely will be rela-

tively modest. However, for certain industries and firms, the negative impacts could be more significant.

OVERALL ECONOMIC EFFECTS OF THE SP

In a previous analysis, we indicated our view that the overall economic effect of the SP will likely be (1) negative in the near term (in large part due to the various dislocations that will occur in the economy) and (2) unknown in the longer term (depending partly on the specific ways in which the SP's individual provisions are implemented). In both cases, however, we indicated that the economic impacts would likely be modest relative to the overall size of California's economy.

The two principal avenues by which the SP will adversely affect the level of economic activity in California involve increased energy prices and the need for new investments. The exact impacts in these areas will depend to a significant extent on exactly how the SP's measures are designed and phased in. This includes how certain currently unresolved issues are ultimately decided such as the use of "safety valves" (that is, provisions that help to administer SP measures so as to avoid certain undesired effects) for various programs, how carbon emission allowances would be allocated or auctioned, and how California's SP measures would phase out or change if certain regional or national policies came into effect.

The higher energy prices anticipated under the SP arise because of such factors as the increased costs of using alternative fuels, reducing the carbon content of fuels, and placing caps on the quantity of emissions permitted. Regarding the need for increased investments, some of these will be required in order to comply with the SP's regulatory standards, whereas others will be undertaken by businesses as least-cost approaches to meeting the SP's requirements. For example:

- The proposed cap-and-trade (C&T) program may require businesses to acquire emission allowances. Affected businesses, primarily in the utility and manufacturing sectors, may need to buy allowances from the state or from other participating entities. Allowances will be accounted for like other productive assets such as commercial real estate.
- The Low Carbon Fuel Standard (LCFS) places requirements on the transportation sector as a whole, not on specific businesses. Regulated businesses include producers or importers of fuel, fuel dispensers, and suppliers of fuel. Businesses that make relatively high carbon-intensity fuels may make investments in research, development, or production of relatively low-carbon fuel in California.

THE PHENOMENON OF ECONOMIC LEAKAGE

When the relative costs of doing business in California change compared to those in other states and nations, businesses take this into account in making their decisions about where to locate their activities. Specifically, when the costs of doing business in California rise, certain firms may decide to relocate outside of California, not expand in California, or make other similar types of adjustments. This is referred to as "economic leakage." Because implementation of the SP is expected to cause energy prices in California to rise and firms to face certain investment requirements, the costs of doing business in California will increase and cause such economic leakage to occur. Economists who study climate policies have emphasized the importance of being aware of the potential for economic leakage in designing such policies and determining their ideal geographic scope of coverage. There are two reasons for this. First, the greater the amount of economic leakage that occurs, the greater will be the net adverse economic impacts of a policy on the adopting governmental jurisdiction. Second, economic leakage will lessen the net amount of greenhouse gases (GHGs) reductions a given climate policy generates, since the economic activity that is shifted will also generate GHGs.

Is California at Risk? Economic leakage tends to be greatest when the jurisdiction adopting a given policy is small relative to its competitors, such as in the case of a local government. California, in contrast, is a very large economy. Despite this, however, it too has to be concerned about economic leakage. This is because it directly competes with other states and nations, and economic activity can be fairly mobile over time across borders in today's modern economy.

The ARB Has Not Effectively Analyzed Economic Leakage. Despite the potential importance of leakage, ARB's evaluation of economic leakage within its economic analysis of the SP is deficient. This in part is because the economic model used by ARB is not well suited to analyze leakage, including being able to provide the necessary detail about how leakage affects individual industries and sub-industries.

What Factors Determine the Extent of Economic Leakage?

The extent to which economic leakage will occur under the SP will depend largely on four factors:

- ***Importance of Trade-Related Activities.*** Industries that are highly active in interstate and international trade, whether with respect to their final outputs or the inputs they rely on, will be especially vulnerable to economic leakage. This is because of their sensitivity to relative prices and costs in the different geographic areas where they do business.
- ***Importance of Energy-Dependent Activities.*** Industries highly dependent on energy as an input to their production processes also will be especially af-

fected by the SP in terms of economic leakage because of the higher energy prices that the SP will cause.

- ***Climate Policies in Other Jurisdictions.*** The greater the extent to which California's climate policies are outliers compared to those of other states, the greater will be the potential for economic leakage.
- ***Extent to Which Mitigating Actions Are Undertaken.*** To the extent that certain steps are taken to mitigate the adverse economic consequences of the SP's provisions, economic leakage will be reduced. These steps can include a phase-in of regulatory provisions and specific cost containment polices.

We discuss these key determinants of economic leakage further below.

HOW SIGNIFICANT MIGHT ECONOMIC LEAKAGE BE FOR CALIFORNIA?

Pinpointing the exact amount of leakage that California might experience under the SP is difficult, partly due to data limitations and partly because certain businesses will be able to fully or partially "pass" or "shift" their higher costs associated with energy prices and investment requirements on to consumers, workers, or shareholders. To the extent such shifting occurs, it would mitigate the extent to which businesses would have their profitability adversely impacted by the SP, thereby potentially reducing leakage. Absent such shifting, however, in terms of the four key factors identified above that are principal determinants of the amount of leakage, we can say the following.

Trade-Related Activities

Because California is a relatively open economy that relies heavily on trade-related activities, one would expect that leakage under the SP could potentially be a significant problem, all else constant. Firms involved with significant trade-related activities are often dealing with larger markets which they have limited ability to influence. As a result, they tend to be "price takers" who are often unable to pass their increased costs forward in the form of higher prices because they will lose sales and significant market share to competitors. Such firms will thus have a stronger incentive to shift their activities to locations out of state where there is no need to increase prices. In the case of the SP, this means shifting to locations where they do not face the higher energy prices and investment requirements associated with SP provisions.

Energy Intensity

California has a number of industries that are relatively energy-intensive and thus would be susceptible to leakage due to higher energy prices in California versus elsewhere. Examples of such industries include those producing or refining aluminum, chemicals, forest products, glass, metal castings, minerals, petroleum, and steel. While it is true that California is relatively more energy-efficient than are other states and this

mitigates its susceptibility to leakage, energy-intensive activities still are prone to experiencing leakage under the SP.

Industries That Are Both Trade-Exposed and Energy-Dependent Are Particularly Vulnerable

Given the above, industries whose production processes are highly reliant upon energy as an input, are engaged in trade-related activities, and encounter a high level of competition from outside the state would be particularly susceptible to leakage. To the extent that a firm in these circumstances has the ability to relocate, it may feel greater pressure to do so as its costs of production increase due to the SP. However, the extent to which it does so will at the same time be influenced by other factors—such as proximity to its customer base and access to a qualified labor force. These factors may in some circumstances outweigh the pressure created from increased cost of inputs. For example, the petroleum industry may realize an increase in production costs due to increased energy prices. However, taking into consideration the large amount of capital invested in infrastructure within California, the close proximity to one of the West's largest customer bases, and the difficulty associated with permitting these types of facilities, it is unlikely that such firms in the near term will seek to relocate outside of the state. Instead, these firms will likely seek other means to compensate for increased costs. This may mean greater investment in technological efficiencies or firms may simply attempt to pass increased costs on to their customers.

Small Share of California's Economy Falls Into This Highest-Risk Category. Over the past several decades, the make-up of the California economy has shifted to what many consider to be primarily service-based activities. As such, a relatively limited percentage of the state's economy is comprised of industries which are both highly trade-exposed and highly energy-dependent, and thus highly susceptible to leakage. This means that instead of significant economic leakage, the SP will likely result in inflationary pressure throughout the state's economy. This is due to the fact that, while we may not see a large exodus in a majority of California's industries, most will nonetheless seek a means by which to compensate for their increased costs of production. Since energy in some form is an input in the production of most goods and services, we would expect to see such price effects occur throughout the economy.

Climate Policies Adopted Elsewhere

In terms of this third determinant of the degree of economic leakage under the SP, California's climate-related policies, compared with those adopted elsewhere, are generally both more aggressive and more comprehensive. Adoption of the SP would not amount to California literally "going it alone" in the climate area, however, because other states have, to varying degrees, adopted certain of their own climate-related policies. This would work to somewhat reduce the degree of economic leakage that would occur under the SP.

Brief Review of California's SP Policies. The SP contains a diverse set of 72 measures now in various stages of design and implementation. Each will affect the economy to some degree. The three largest programs, which account for roughly half of planned GHG emission reductions, are the C&T program, the LCFS, and the Renewable Portfolio Standard (RPS).

- ***Under the C&T***, an overall limit on aggregate emissions from a short list of covered entities will be established. The cap will shrink over time and entities subject to the cap will be able to trade permits (allowances) to emit GHGs.
- ***The LCFS*** establishes performance standards that fuel producers and importers must collectively meet each year beginning in 2011. Each standard is set to tighten gradually to achieve an average 10 percent reduction in the carbon intensity of the statewide mix of transportation fuels by 2020.
- ***The RPS*** as it is currently being proposed would require each electric utility to increase electricity procurement from renewable sources over time. By 2020, at least 33 percent of the utility's overall electricity portfolio must be procured from renewable sources such as wind, geothermal, solar, biomass, and small hydro. Specific interim targets are still under development.

The other roughly half of planned GHG emission reductions is due to a wide variety of other programs, including such things as building standards.

What Have Other States Done? Currently, 35 other states have adopted an RPS. In addition, there is a federal LCFS although it is less restrictive than California's, and a 12-state consortia in the Northeast is in the process of developing a similar standard. Development of a California C&T regulation continues within the context of the Western Climate Initiative, a collaboration of western states and Canadian provinces that together would form a trading market for carbon credits. In those cases where climate policies are actually in place, these would, to varying degrees, reduce the economic leakage problem that implementing the SP would involve.

We have not had the opportunity to thoroughly assess the specifics of other states' climate-related policies and how they compare to California's SP. Doing a detailed analysis is important because two jurisdictions can appear to both "have" a climate policy of a given type, but in reality not be at all comparable due to such factors as differences in phase-in provisions and coverage. Our preliminary assessment, however, is that while these state policies would reduce the amount of economic leakage California would otherwise experience to a material degree, they would by no means eliminate it. As noted earlier, taken together, California's policies are both more aggressive and more comprehensive than elsewhere. An exception involves the RPS, where California's policy is not all that much of an outlier.

A significant potential for economic leakage caused by the SP will most likely arise from the implementation of a C&T program. This is due to the fact that only a small number of states nationwide currently have such a program. Although C&T is being considered at the national level, it appears unlikely that Congress will come to an agreement on the issue this year. While it would be highly preferable to move forward with such a market mechanism on a national as opposed to state level, there are steps California can take to mitigate the adverse economic impacts and potential for leakage due to the state moving forward on its own with the implementation of such a policy (see below).

SP Implementation Decisions

In terms of the fourth determinant of economic leakage—that is, the extent to which mitigating actions are taken through the design of the SP's measures and the way they are implemented through the regulatory process—the exact outcome here remains to be seen. Examples of things to consider include the following.

Phase-In Periods. One obvious means of mitigating the leakage problem is to phase in the SPs provisions over time. The goal should be to find an appropriate phase-in speed that avoids particularly harsh economic side effects. For example, economic leakage might be reduced by giving firms ample time to arrange for making their required investments without encountering significant financial stress. This could be especially important for small business with limited access to capital markets. In recognition of this concern, a number of the SP measures are planned to be phased in over time.

RPS-Related Considerations. Key considerations here include both the overall percentage of renewable procurement required by state standards, the pace at which standards are phased in, as well as the provision for trading of renewable energy credits. By providing greater compliance flexibility, the state may be able to reduce leakage and reduce impacts on energy prices. As California moves forward with the implementation of its RPS program, many cost containment provisions are being designed and considered by California regulators.

C&T-Related Considerations. One issue here is giving consideration to allocating emissions allowances in order to limit the potential for negative economic exposure that an auctioning of allowances could cause. For example, one option would be to consider a free allocation of allowances in the initial years of the program—with an eventual phasing in of an allowance auction. Such an approach may serve to limit some of the economic burden the C&T program will place on carbon-intensive industries and may thus minimize the potential for economic leakage in these sectors.

Conclusion Regarding Economic Leakage

Quantifying the net impact of the above factors on leakage is not possible, for a variety of reasons. For example, to our knowledge, no one yet has evaluated which Califor-

nia industries are highly leakage prone. Such an evaluation would be a difficult task because it involves not only such factors as an industry's use of energy and trade-related activities, but also other factors like its overall competitive environment.

That said, we believe industries highly susceptible to economic leakage comprise only a modest share of the state's economy, for several reasons. First, the contribution to the state's economy of *broad* industry classifications identified as susceptible to international leakage from national energy and climate policies—such as petroleum refining, aluminum production, or glass making—is relatively small, based on Economic Census data. Second, only specific industries in those broad classifications are likely to be highly leakage prone. Third, the profitability differences among states required for significant leakage in the near term may be fairly high for certain members of broad, susceptible industry classifications, such as mining or heavy manufacturing. Fourth, many businesses in these sectors have significant market power, and so should be able to pass on portions of their cost increases associated with the SP to consumers. In those situations, leakage might be less of a concern, although adverse economic impacts could occur in other ways (such as higher prices to consumers).

Taking all this into account, we believe that the most likely outcome with regard to economic leakage of implementing the SP in the absence of similar policies in place elsewhere is that a modest amount would occur.

LAO Bottom Line

In considering implementation of the climate policies contained in ARB's SP, the Legislature will need to balance both the risks and potential benefits involved. To the extent California proceeds with implementing climate policies that are different and more stringent and comprehensive compared to those that have been adopted elsewhere in the nation, it faces risks that:

- Certain specific companies within our current economy that are adversely impacted by SP's measures may significantly reduce their business activities in California. These are most likely to lie within broad energy-intensive and trade-sensitive industries such as producers or refiners of aluminum, chemicals, forest products, glass, metal castings, minerals, petroleum, or steel.
- Such economic leakage may be mitigated, however, although not eliminated, by the adoption of certain climate-related policies in other jurisdictions, various accommodative design features associated with the actual implementation of the SP's measures, and growth in other sectors of the economy that will likely be stimulated by the SP, such as in the "green" economy.

Although there are very substantial shortcomings in the data and modeling available to accurately assess the relative quantitative magnitudes and probabilities of eco-

nomic leakage, we believe the likely adverse impact on the economy of economic leakage is probably modest.

Should you have questions regarding this information, please feel free to contact Tiffany Roberts at 319-8309 regarding specifics about AB 32 and the SP, and James Nachbaur at 319-8365 regarding economic issues.

Sincerely,

Mac Taylor
Legislative Analyst