Macroeconomic Impacts of the California Global Warming Solutions Act on the Southern California Economy

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Executive Summary

We evaluate the potential regional macroeconomic impacts of a set of ten mitigation policy options to enable the Southern California Association of Governments (SCAG) to comply with the State's greenhouse gas (GHG) reduction targets specified in California Assembly Bill 32 (AB32), the California Global Warming Solutions Act. AB32 calls for the cutback of GHG emissions to Year 1990 levels by the Year 2020, and even more stringent reductions in subsequent years. It stipulates the implementation of a combination of cap and trade policy instruments and several complementary, primarily regulatory, policies to achieve these targets. Some are concerned that the implementation of AB32 will incur substantial direct and indirect costs to California as a whole, and further that some of the State's sub-regions and sectors might shoulder a disproportionate share of these costs. At the same time, others suggest that, if

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structured properly, AB32 can have positive overall economic outcomes and incur limited impacts to small businesses and energy-intensive sectors.

To implement AB32, the State and its various sub-regions have developed climate action plans that identify various technological options and regulatory policy designs to reduce GHG emissions. The direct benefits of these plans are the avoided damages from climate change. There are also several co-benefits of implementing climate action plans. One is the reduction in ordinary (EPA "criteria") air pollutants accompanying a shift to renewable energy resources or implementation of energy-efficiency improvements. Another is the decrease in energy use and hence increased U.S. energy security. A third is the possibility that GHG mitigation will have a beneficial effect on the economy in terms of stimulating more "green jobs" than are displaced by the loss of jobs in traditional energy sectors, as well as from potential cost increases that cause a dampening of demand for goods and services. Moreover, both the positive and negative stimuli generate ripple effects up and down the supply chain. These indirect effects are much more subtle and require a formal model to evaluate properly.

The SCAG Region is the largest economic region in California in terms of population and economic activity. We examine the economic implications of ten major mitigation options individually and as a group implemented in the SCAG Region and their ripple effects on the rest of California and the U.S. Our analysis utilizes the results of the findings of Technical Work Groups (TWGs) in the areas of energy supply (ES), residential/commercial/industrial demand (RCI), and agriculture/forestry/waste management (AFW) (transportation emissions are addressed in a separate legislation known as State Senate Bill 375). We insert these microeconomic results into the Regional Economic Models, Inc. (REMI) Policy Insight Plus (PI^+) Macroeconometric Model to ascertain the total economic impacts on the SCAG economy.

In so doing, we further refine a methodology for the application of the REMI Model that we have used successfully in evaluating climate action plans in several other states.

Our results indicate that the majority of the ten GHG mitigation options yield positive total regional economic impacts in terms of employment impact. The combination of these mitigation policy options could create an annual average employment gain of 21 thousand jobs over the entire planning period from now to 2035, but could also have a negative net present value impact of $17 billion in SCAG Region GDP. In percentage terms, the increase in employment represents about a 0.5% increase above baseline, while the GDP loss only represents a decline of less than 0.1% below baseline.

Our results also indicate a great disparity in the impacts across individual mitigation options. Energy efficiency improvement, such as energy-efficient building codes, generate positive economic impacts in terms of both their direct effects (e.g., cost savings that lower the price of goods and make them more attractive for regional and export markets) and indirect effects (e.g., demand for inputs up through successive rounds of the supply chain). On the other hand, the Renewable Portfolio Standard (RPS) is projected to result in a substantial loss of jobs and GDP. The cost of renewable alternatives must be evaluated in relation to the fossil energy generation they replace, and in the SCAG Region, this involves displacement of relatively cheap natural gas-fired generation. Moreover, the price of natural gas has decreased enormously over the past couple of years. In our previous studies, we found the RPS is likely to generate positive economic impacts in Florida and even in Michigan, but this was under conditions of relatively high gas prices prevailing in 2009-10 and projections into the future on that basis. Another important factor that distinguishes the SCAG case is the fact that projections of capital and

operating costs of renewable electricity generation are not expected to decline as much as in previous forecasts.

Sensitivity analyses were undertaken to validate the results and to determine their robustness—whether the results do not change greatly when changes are made to key assumptions and parameters. A side dividend of our sensitivity analysis relates to policy design -- it provides a guide to making the results more positive, and thus provides a basis for government and the private sector to cooperate in achieving the best possible outcome of climate policy. For example, the negative regional economic impacts of the RPS can be significantly reduced if the region can attract more manufacturers of renewable electricity generation equipment to the state. Incentives to encouraging R&D to bring down the cost of renewable electricity generation can greatly improve the macroeconomic performance of these technologies.

Our estimates of macroeconomic impacts on the SCAG Region do not include the economic value of other benefits of implementing AB32, including the avoidance of negative environmental impacts from continued GHG emissions that would be mitigated, the savings from the associated decrease in ordinary pollutants that impact human health, and the reduction in the use of natural resources. Any regional economic losses from mitigation must be compared with the direct benefits, as well as any other co-benefits relating to reduction in more general pollution and reduction in energy use and other positive implications of GHG emission mitigation.