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# LAO's Critique of the AB 32 Scoping Plan Economic Analysis

LEGISLATIVE ANALYST'S OFFICE

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Hon. Nancy Skinner, Chair

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# Summary of Air Resources Board's Economic Analysis Findings

☑ ***The Air Resources Board's (ARB's) Bottom Line: Scoping Plan Leads to Direct Economic Savings.*** The AB 32 scoping plan includes 31 greenhouse gas (GHG) emissions reduction measures to be applied to 8 broad sectors of the economy that together would reduce GHG emissions to 1990 levels by 2020, as required by AB 32. The ARB concludes that implementation of these measures would eventually result in nearly $16 billion in net "annualized" direct *savings* to California businesses and households as a whole. (Annualized costs/savings are the theoretical costs/savings that would result in any given year that a measure remains in effect. The ARB projected $40 billion of annualized savings and $25 billion of annualized costs, and therefore *net* annualized savings.)

☑ ***The ARB's Macroeconomic Modeling Shows a Slight, Positive Effect.*** Based on the inputs provided by ARB into a macroeconomic model to assess the effects of the scoping plan on jobs, gross state product, and income, the ARB found that:

- There would be an overall, though slight, positive effect on the state economy as of the year 2020, with increased total state output of 0.9 percent ($33 billion) and gross state product of 0.3 percent ($7 billion).
- The strongest, overall positive economic effects would occur in the agriculture, forestry, and fishing sector—a 3.9 percent ($4 billion) increase in economic output, and a 3.5 percent (15,000 job) increase in employment.
- Overall economic loss would be contained to the utilities sector—a 16.7 percent ($12 billion) decrease in economic output, and a 14.7 percent (10,000 job) decrease in employment.

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# Summary of ARB's Economic Analysis Findings *(Continued)*

☑ ***Costs and Savings Concentrated in Transportation Sector.*** While the ARB plan would reduce GHG emissions in the transportation sector roughly in keeping with its share of GHG emissions (about 36 percent), the transportation sector would represent a much larger share of the plan's costs and savings, as shown in Figure 1 below.

**Figure 1**

**Costs and Savings Concentrated in Transportation Sector**

*(Dollars in Millions)*

| Sector | Percentage BAU GHG Emissions | Annualized Costs | Percent Annualized Costs | Annualized Savings | Percent Annualized Savings | Net Annualized Costs/Savings[a] |
|---|---|---|---|---|---|---|
| Transportation | 37.8 % | $16,208 | 65.1% | $30,255 | 74.9% | -$14,047 |
| Electricity | 23.3 | 7,436 | 29.9 | 8,627 | 21.3 | -1,191 |
| Industry | 16.9 | 11 | <1.0 | 71 | <1.0 | -60 |
| HGWP gases | 7.9 | 159 | <1.0 | 30 | <1.0 | 108 |
| Commercial and residential | 7.8 | 963 | 3.9 | 1,433 | 3.5 | -470 |
| Agriculture | 5.0 | 156 | <1.0 | — | — | 156 |
| Recycling and waste management | 1.3 | 52 | <1.0 | — | — | 52 |
| Forests | — | 50 | <1.0 | — | — | 50 |

[a] Negative dollar amounts represent net savings.

BAU = business as usual, GHG = greenhouse gas, HGWP = high global warming potential.

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# Summary of ARB's Economic Analysis Findings *(Continued)*

☑ ***Net Savings Heavily Concentrated in One Measure—the "Pavley Regulations."*** As shown in Figure 2 below, the net annualized savings identified by the scoping plan are concentrated in one measure—the so-called Pavley light-duty vehicle GHG emissions regulations (developed in accordance with Chapter 200, Statutes of 2002 [AB 1493, Pavley]). Of the roughly $16 billion in net annualized savings identified by the plan, approximately $11 billion—70 percent—comes from implementation of the Pavley regulations.

**Figure 2**

**Greenhouse Gas Reduction Costs and Savings Concentrated in a Few Measures**

*(Dollars in Millions)*

| Measure | Reductions (MMTCO2E) | Annualized Costs | Percent | Annualized Savings | Percent | Net Annualized Costs/Savings[a] |
|---|---|---|---|---|---|---|
| Pavley light-duty vehicle emissions regulations | 31.7 | $1,966 | 8.0% | $13,024 | 32.2% | -$11,058 |
| Increase renewable portfolio standard (33 percent by 2020) | 21.3 | 3,672 | 14.9 | 1,889 | 4.7 | 1,783 |
| Energy efficiency and conservation—electricity | 15.2 | 3,402 | 13.8 | 5,065 | 12.5 | -1,663 |
| Low-carbon fuel standard | 15.0 | 11,000 | 44.5 | 11,000 | 27.2 | — |
| Heavy-/medium-duty vehicle aerodynamic efficiency | 0.9 | 1,616 | 6.5 | 2,137 | 5.3 | -521 |

MMTCO2E = Millions of Metric Tons of Carbon Dioxide Equivalents.

[a] Negative dollar amounts represent net annualized savings.

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# Issue #1: Inconsistent and Incomplete Evaluation of Costs and Savings

☑ ***Scoping Plan Includes Emissions Reductions, But Intentionally Excludes Costs or Savings, Associated With Some "Non-AB 32" Measures.*** Some of the measures recommended in the scoping plan are already required by statute or administrative action other than AB 32 (non-AB 32 measures). The ARB's economic analysis intentionally excluded a calculation of the costs/savings for some of the non-AB 32 measures, including the million solar roofs initiative, but included the costs/savings of others, including the Pavley light-duty vehicle emissions regulations. The ARB's differing treatment of costs and savings associated with non-AB 32 measures substantially affects the ARB's bottom-line economic projections for the plan.

☑ ***Some Costs and/or Savings Undetermined for Some Measures Due to Lack of Information or Analysis.*** The ARB has yet to identify the annualized costs and/or savings associated with a number of measures in the scoping plan. While some of these measures are not being relied on for a major portion of the emissions reductions under the scoping plan, others are. Specifically, the effect of the cap-and-trade program—which accounts for about 20 percent of the emissions reductions under the scoping plan—on the plan's economic bottom line is unclear, as costs and savings data for this program have not been developed.

☑ ***Weak Basis for Low-Carbon Fuel Standard Assumptions.*** The ARB's analysis claims that the $11 billion in annualized costs to implement the low-carbon fuel standard would be offset fully by equivalent savings on petroleum products (mainly gasoline) that would no longer be purchased for transportation purposes. Therefore, according to ARB, the net annualized cost of this measure is zero. The ARB acknowledges that these estimates of costs and savings associated with this measure are weak at present. The scoping plan is based on the uncertain assumption that fuel producers can produce ethanol and biodiesel at costs similar to the current and projected high price of gasoline and diesel.

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# Issue #2: Macroeconomic Modeling Lacks Analytical Rigor

☑ ***Results of Economic Modeling Depend Heavily Upon Several Key Assumptions.*** Our analysis indicates that the most significant assumptions used by ARB in its economic modeling of the scoping plan are the direct economic costs and savings that it assumes result from each GHG reduction measure. These inputs drive the model's finding of net economic benefit from the scoping plan measures. It is not particularly insightful that the model predicts a positive economic effect for the scoping plan based on an input of $16 billion in assumed annual net savings.

☑ ***Despite Reliance on Key Assumptions, Plan Provides Limited "Sensitivity Analysis."*** Sensitivity analysis determines how dependent the findings of an economic model are to changes in individual variables used in the model. The ARB indicates that, though it has not conducted a sensitivity analysis of the scoping plan (apart from a very rudimentary preliminary analysis), it hopes to do so in the future.

The lack of sensitivity analysis is particularly problematic, given that the findings of ARB's economic analysis rely so heavily on a small number of key assumptions. It is impossible for decision makers to fully evaluate the scoping plan and its economic effect without an awareness of the degree of uncertainty connected with these assumptions and the risk associated with that uncertainty.

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# Issue #3: Limited Role of Economic Analysis in Scoping Plan Development

☑ ***Scoping Plan Development Preceded Economic Analysis.*** The ARB's selection of measures for inclusion in the scoping plan preceded its economic analysis. The ARB developed the scoping plan by first selecting a collection of measures that conceivably could achieve the GHG emissions reductions called for by AB 32. Once it had compiled and developed that collection of measures, ARB estimated the associated direct costs and savings of those measures and input those dollar amounts into its macroeconomic model.

☑ ***Economic Modeling Did Not Inform Selection of Plan's Measures.*** While the ARB's modeling provided new macroeconomic findings related to the scoping plan, the ARB did not use these findings in its selection of measures to include in the scoping plan or in its development of the individual measures.

☑ ***Cost-Effectiveness Analysis Did Not Inform Plan's Mix of Measures or Relative Importance of Individual Measures.*** It appears that, in general, the ARB's selection of particular measures and the mix of measures in the plan were not directly influenced by cost-effectiveness considerations. For example, the ARB did not eliminate measures from the scoping plan that fell below a preset cost-effectiveness threshold. In fact, ARB deemed all measures included in the plan "cost-effective" simply because they reduce GHG emissions, whatever the cost.

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# Issue #4: Failure to Lay Out an "Investment Pathway"

☑ ***The ARB's Analysis Fails to Explicitly Identify Timing of Needed Investments and Related Savings.*** Despite its prediction of eventual net economic benefit, the scoping plan fails to lay out an investment pathway to reach its goals for GHG emissions levels in 2020. Such a pathway would describe, year-by-year, the investments required by implementation of the plan and the timing of the economic return on those investments.

Investment pathway information is very important to businesses and households that would be responsible for these investments, especially in the current climate of pronounced economic uncertainty and scarce credit. In addition, because the modeling approach used provides information about how broad economic sectors would be affected, but not individual businesses and households, it cannot identify the types of disruptions certain parties could face under the plan.

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# Moving Forward With the AB 32 Scoping Plan

As the ARB continues to develop the scoping plan's measures up to and through regulatory development, **we recommend that**:

☑ ***The Legislature exercise oversight to ensure that AB 32 is implemented cost-effectively and efficiently, and that the gaps and weaknesses in the economic analysis that we have identified are addressed.*** Specifically, the Legislature should direct that ARB evaluate economic costs and savings for *all* scoping plan measures, perform a sensitivity analysis as part of that evaluation, and develop an investment pathway for each measure.

☑ ***The ARB take full advantage of the findings and outcomes of its economic analysis and modeling to inform the make-up of the scoping plan in terms of the mix of measures and relative importance of particular measures***. In other words, the scoping plan should be seen as a fluid plan that adapts to the outcomes from the ongoing economic analysis.

☑ ***The Legislature provide policy direction on the use of market-based compliance mechanisms.*** The use and design of market mechanisms are very complex and involve many key policy choices. For example, the cap-and-trade program proposal raises the contentious policy choice regarding the initial allocation of emissions allowances, including the pricing of such allowances. While successful examples of the use of market mechanisms to control air emissions exist, such as the federal acid rain program, there is little experience with the use of these mechanisms to control GHG emissions. As ARB continues to develop its proposed cap-and-trade program, it will be important for the Legislature to oversee and provide policy direction on the issues raised by it.