Updated Economic Analysis

• Completed based on Board direction
• Estimates the state-level economic effects of implementing the Scoping Plan measures
• Not a substitute for, but will inform measure-specific analyses such as the cap-and-trade regulation
What’s Different About this Analysis?

• New Business-as-Usual projection
  – Updated forecasts reflecting recent economic downturn
  – Pavley regulations
  – 20% RPS
• Uses a dual modeling approach
  – Energy 2020 model
  – E-DRAM model
• Sensitivity analysis
  – 4 additional modeling cases
• Economic and Allocation Advisory Committee (EAAC) formed to advise ARB

• Staff has worked closely with EAAC to refine methodologies and discuss results

• Staff will continue to consult with members of EAAC as part of the cap-and-trade program development
Key Measures Analyzed

The modeling focuses on several key Scoping Plan measures

• Electricity and natural gas energy efficiency programs and standards
• 33 percent Renewable Energy Standard
• Increased use of combined heat and power
• Regional VMT reduction targets
• California’s clean car standards (LEV III)
• Goods movement measures
• Low Carbon Fuel Standard
• Cap and Trade
Energy 2020

- ENERGY 2020 is a detailed energy analysis system that simulates the supply, price, and demand for all fuels
- Useful for analysis of key Scoping Plan measures and certain aspects of the cap-and-trade program
• E-DRAM is a computable general equilibrium (CGE) model of the California economy
• CGE models are standard tools of empirical analysis that are widely used to analyze the impacts of policies whose effects are transmitted through multiple markets
Combining the Models

Energy 2020
1. CO\textsubscript{2} price
2. Energy demand investments
3. Energy supply investments
4. Fuel expenditures

E-DRAM
1. Sector-level output
2. Personal income
3. Population
• Electricity and Natural Gas Measures
  • Energy efficiency programs and standards
  • 33 percent Renewable Energy Standard
  • Increased use of combined heat and power
• Transportation-related GHG measures
  • Regional VMT reduction targets
  • California’s clean car standards (Pavley I)
  • Goods movement measures
  • Low Carbon Fuel Standard
• Cap-and-Trade with 4% offsets
Sensitivity Cases (Cases 2-5)

Case 2: No offsets in cap-and-trade; full complementary policies
Case 3: Fewer reductions from transportation measures
Case 4: Fewer reductions from electricity and natural gas measures
Case 5: Combination of Cases 3 and 4

Note: AB 32 target achieved in all cases
2020 Economic Effects

Gross State Product

Billions of $2007

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Gross State Product</th>
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<tbody>
<tr>
<td>Business as Usual (BAU)</td>
<td>2,700</td>
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<tr>
<td>Scoping Plan</td>
<td>2,500</td>
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<tr>
<td>No Offsets</td>
<td>2,300</td>
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<tr>
<td>Reduced Transportation</td>
<td>2,100</td>
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<tr>
<td>Policies</td>
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<tr>
<td>Reduced Electricity</td>
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<tr>
<td>Policies</td>
<td>2,100</td>
</tr>
<tr>
<td>Combined Reduction</td>
<td>2,100</td>
</tr>
</tbody>
</table>
2020 Economic Effects

Income Per Capita

Thousands of $2007

- Business as Usual
- Scoping Plan
- No Offsets
- Reduced Transportation Policies
- Reduced Electricity Policies
- Combined Reduction
2020 Economic Effects

Employment

Thousands of Jobs

- Business as Usual
- Scoping Plan
- No Offsets
- Reduced Transportation Policies
- Reduced Electricity Policies
- Combined Reduction
Study Results

• California’s emissions target could be achieved while maintaining economic growth
• Less effective implementation of some complementary measures could increase costs
• Offsets reduce costs
Comparison with Other Economic Analyses

• ARB results are consistent with other economic analyses of AB 32 and federal climate change proposals

• Modeling approaches vary but reach similar conclusions – impacts on GDP are small relative to projected growth between now and 2020
Comparison with Other Economic Analyses of Climate Policy

The diagram compares GDP relative to BAU for California Policy and Federal Policy across various economic analyses. The analyses are color-coded and include:
- **BAU**: Represented by red bars.
- **ARB Updated**: Blue bars.
- **ARB Original**: Blue bars.
- **Roland-Holst**: Blue bars.
- **EPRI/CRA (2007)**: Blue bars.
- **S.2191 (ADAGE)**: Blue bars.
- **S.2191 (IGEM)**: Blue bars.
- **S.1733 (ADAGE)**: Blue bars.
- **S.1733 (IGEM)**: Blue bars.
- **CBO Meta (High)**: Blue bars.
- **CBO Meta (Low)**: Blue bars.

The diagram shows a comparison of the economic impact on GDP for each analysis scenario, with values ranging from 0% to 120% relative to BAU (BAU=100%).
Small Business Analysis

• Indicates that there are unlikely to be significant adverse or disproportionate impacts on small business

• ARB will work with small business to design programs and provide opportunities for California small businesses
Achieving AB 32 Goals

- Analysis demonstrates the Scoping Plan strategy for reducing greenhouse gases represents a cost-effective approach to implement AB 32
- Individual implementation of Scoping Plan measures will be informed by this economic analysis
Next Steps

- April discussion
- Continue working with EAAC
- Analyses to support individual AB 32 measures