AB 32 Economic Analysis Update

March 25, 2010
California Air Resources Board
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
Working with EAAC

• 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 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

- 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.
E-DRAM
Combining the Models

Energy 2020
1. CO₂ price
2. Energy demand investments
3. Energy supply investments
4. Fuel expenditures

E-DRAM
1. Sector-level output
2. Personal income
3. Population
Scoping Plan Policy Case (Case 1)

• 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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Billions of $2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business as Usual</td>
<td>2,700</td>
</tr>
<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 Policies</td>
<td>2,100</td>
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<tr>
<td>Reduced Electricity 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

<table>
<thead>
<tr>
<th>California Policy</th>
<th>Federal Policy</th>
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<tbody>
<tr>
<td>BAU</td>
<td>100%</td>
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<tr>
<td>ARB Updated</td>
<td>100%</td>
</tr>
<tr>
<td>ARB Original</td>
<td>100%</td>
</tr>
<tr>
<td>Roland-Holst</td>
<td>100%</td>
</tr>
<tr>
<td>EPRI/CRA (2007)</td>
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<tr>
<td>S.2191 (ADAGE)</td>
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<tr>
<td>S.2191 (IGEM)</td>
<td>97%</td>
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<tr>
<td>S.1733 (ADAGE)</td>
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<td>S.1733 (IGEM)</td>
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<tr>
<td>CBO Meta (High)</td>
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</tr>
<tr>
<td>CBO Meta (Low)</td>
<td>99%</td>
</tr>
</tbody>
</table>

GDP 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