

Economic Evaluation Supplement Climate Change Draft Scoping Plan Pursuant to AB 32 The California Global Warming Solutions Act of 2006

Appendix IV Calculation of Household Savings by Income Group

1 Introduction

This appendix provides additional background on the calculation of the potential effects of the Preliminary Recommendation from the Draft Scoping Plan on households as discussed in Section 2.3 of the Economic Supplement. To evaluate these effects, we first determined consumer expenditures on major goods and services as a function of income levels and household size. Then, we adjusted those expenditures based on the non-energy price changes reflected in the E-DRAM modeling of the Preliminary Recommendation. Finally, we factored in additional savings from energy efficiency improvements for the residential and transportation sectors, including the Pavley regulation (Light-Duty Vehicle GHG Standards). The results from these calculations indicate a net annual savings of \$400 to \$500 per household for the various income categories – two percent or less of total household expenditures – due to implementation of the Preliminary Recommendation.

2 Calculation of Household Savings by Income Group

To assess the impacts of projected price changes, we used household expenditure data from the Bureau of Labor Statistics' Consumer Expenditure Survey (2005-2006)¹ to obtain budget shares devoted to major consumer categories for different income groups. The budget shares for low- and higher-income households are shown in Table IV-1.

Because the precise effects of the Preliminary Recommendation on non-energy household consumption are unclear, we assume that it remains constant as a conservative starting point. This assumption allows current expenditures to serve as a proxy for consumption levels. Constant consumption implies that households are not adjusting their purchasing in response to price changes. Combining the consumer expenditure patterns with E-DRAM's projected price changes for each non-energy category² yields an estimate of total change in household expenditures for these major goods and services.

¹ The survey is weighted for the entire nation and not for specific state-level analysis.

² In some cases, several E-DRAM industrial sectors are aggregated to form a single expenditure category, e.g. food comprises both food consumed at home and away from home.

**Table IV-1: Budget Shares for Major Expenditure Categories
by Income Group in 2005-2006**

| Expenditure Category | Percent of Household Budget Spent for Each Household Income Level | | | |
|--|--|-----------------|---------------------------------|-------------------------------|
| | 100% Poverty | 200% Poverty | Middle Income ^(a) | High Income ^(b) |
| Housing | 22% | 21% | 18% | 18% |
| Food | 17% | 15% | 14% | 12% |
| Healthcare | 6% | 7% | 6% | 5% |
| Gasoline and motor oil | 5% | 5% | 5% | 4% |
| Apparel and services | 5% | 5% | 4% | 4% |
| Electricity | 4% | 4% | 3% | 2% |
| Entertainment | 4% | 4% | 5% | 5% |
| Vehicle maintenance, repair, insurance | 3% | 3% | 3% | 3% |
| Education | 3% | 2% | 2% | 2% |
| Natural Gas | 2% | 1% | 1% | 1% |
| Water | 1% | 1% | 1% | 1% |
| Other (e.g. taxes, social security payments, vehicle purchases, charitable donations, personal care products/services, etc.) | 27% | 31% | 38% | 44% |

Source: Bureau of Labor Statistics, Consumer Expenditure Survey, Two-Year Cross Tabs 2005-2006

^a All households between 200% and 400% of the poverty guidelines. Note that "\$70,000 or more" is the highest income bracket reported in the Consumer Expenditure Survey. For households of four or more, 400% of the poverty guidelines exceeds \$70,000. In these cases, half of the households were assumed to be uniformly distributed between \$70,000 and the average income reported for this bracket and household size category to distinguish between middle and high income households.

^b All households above 400% of the poverty guidelines. See previous footnote as well.

As shown in Table IV-2, for most major expenditure categories, such as gasoline, food, apparel, and healthcare, E-DRAM projects essentially no change in price (less than one percent and generally a price decrease). However, for the Preliminary Recommendation electricity and natural gas prices are projected to increase eleven and

eight percent, respectively.³ With the exception of electricity and natural gas described below, applying these price changes to current expenditure patterns yields the change in total expenditures resulting from price effects alone (i.e., no changes in consumption levels due to improved efficiency or demand response). Overall, the price effects alone would not significantly change household expenditures in these categories across all household groups, assuming that households do not change consumption in response to new prices.

Table IV-2. E-DRAM Projected Price Changes in 2020 for Select Sectors

| Category | Preliminary Recommendation |
|--------------------------------|-----------------------------------|
| Owned dwellings | 0.0% |
| Rented dwellings | 0.0% |
| Food at home | -0.1% |
| Food away from home | -0.6% |
| Healthcare | -0.6% |
| Gasoline and motor oil | -0.4% |
| Apparel and services | -0.6% |
| Electricity | 11.1% ^(a) |
| Entertainment | -0.5% |
| Vehicle maintenance and repair | -0.3% |
| Vehicle insurance | -0.2% |
| Education | -0.4% |
| Natural Gas | 7.8% ^(b) |
| Water | -0.1% |

Shaded rows indicate increasing prices; Unshaded rows show decreasing prices

- ^a Although E-DRAM projects a price increase for electricity, E3's analysis estimates an overall 5% decrease in electricity bills. The change in bills is more representative of changes in household expenditures. Thus, for this analysis -5% is used for the change in the electricity sector.
- ^b Although E-DRAM projects a price increase for natural gas, the analysis conservatively balances this increase with the estimated 18 percent overall decline in natural gas use in California by assuming no change in natural gas bills.

For the electricity sector, many measures in the *Draft Scoping Plan* are expected to improve end-use electricity efficiency and reduce consumption levels. Total bills will vary depending on the type of customer (e.g. commercial or residential), customer usage patterns, opportunity for reductions in usage from energy efficiency and/or

³ E3's analysis shows a slightly larger increase in average statewide rates of 14 percent, however also shows a net decrease in overall statewide bills.

change in practices, and the rate structure of the electricity provider. Because utility rates are adjusted to collect total utility costs over time, though, a forecast of total utility costs can serve as a proxy for the electricity bills of all customers in the State. Based on projections by Energy and Environmental Economics, Inc.'s (E3) GHG Spreadsheet Calculator for the Joint CEC/CPUC Proceeding on AB 32 (CPUC Rulemaking.06.04.009, CEC Docket 07-OIIP-01), total utility costs for all customers statewide are expected to be approximately five percent lower than the base case in 2020.⁴ Their finding is that the utility savings attributed to energy efficiency and CHP more than make up for the additional costs in the electricity sector. However, as previously discussed, changes to individual entities will deviate from the average and the E3 analysis does not predict how these savings will be distributed among customers. For purposes of this analysis, we assume a household's total electricity bill decreases by five percent on average, which is more representative of the changes to a household's expenditures than just the change in electricity price. Future work will include sensitivity analyses using a broader range of possible electricity bill changes.

For natural gas, E-DRAM projects a price increase of eight percent. We have estimated that the measures in the Preliminary Recommendation will result in an overall 18 percent decrease in natural gas consumption in California. As a conservative estimate that balances the projected price increase with the estimated decline in natural gas consumption, we have assumed no change in natural gas bills for the purposes of this analysis.

In addition, the Pavley regulation (Light-Duty Vehicle GHG Standards) is likely to further enhance the savings to households. The cumulative savings to the household will largely depend on when households are able to purchase either a new or used Pavley vehicle. Based on the economic evaluation conducted during the Pavley rulemaking process, low-income households could expect to save about 100 gallons of gasoline each year by driving a Pavley-compliant vehicle. Using the projected gas prices of \$3.67 per gallon in 2020 (in terms of 2007 dollars), low-income households would save about \$360 in fuel alone in 2020 relative to business-as-usual. Factoring in the additional annualized cost of about \$50 for a used Pavley-compliant vehicle (LT2) yields net savings of approximately \$300 per year. For higher income households purchasing new vehicles and traveling more miles, the net savings total roughly \$400 per year. The findings from this analysis would change if based on different assumptions for fuel prices and/or vehicle costs. For example, to the extent that fuel prices are higher the savings would be greater.

The household savings presented in Table IV-3 were calculated as follows:

- Multiply the average household expenditures for each major category and income group by the price changes projected by E-DRAM for the Preliminary Recommendation. For the electricity category, replace electricity price changes

⁴ The E3 analysis focuses on direct programmatic measures and does not include the incremental price impact of the cap and trade program, which will depend upon allowance price, allocation strategy, the capped sector industry response, and other program design decisions.

with -5 percent to reflect the average reduction in electricity bills as estimated by E3. For the natural gas category, replace the natural gas price change with a zero percent change to reflect the balance between increased prices and decreased use of natural gas.

- Sum the changes for all of the categories.
- Add the net Pavley savings to the total change under the Preliminary Recommendation. For low-income households, net savings equal \$300; for higher income households (greater than 200% of the federal poverty guidelines), net savings total \$400. No distinction was made between middle or high income households in vehicle type purchase or annual vehicle miles traveled.
- Estimates are rounded to one significant digit.

Table IV-3: Total Estimated Household Savings by Income Group in 2020 (2007 \$) Due to Implementation of the Preliminary Recommendation

| | 100% Poverty | 200% Poverty | Middle Income^(a) | High Income^(b) | All Households^(c) |
|-----------------------------|---------------------|---------------------|------------------------------------|----------------------------------|-------------------------------------|
| Total Savings | \$400 | \$400 | \$500 | \$500 | \$400 |
| Share of Total Expenditures | 2% | 1% | 1% | 1% | 1% |

^a All households between 200% and 400% of the poverty guidelines.

^b All households above 400% of the poverty guidelines.

^c Average of households of all income levels.